EARLY DAYS OF MODEL FLYING

NEWNES

# PRACTICAL MECHANICS

9D.

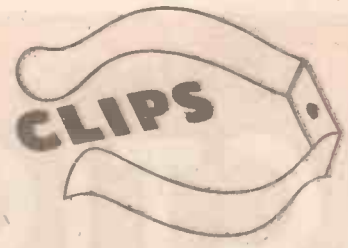
EDITOR : F. J. CAMM

MARCH 1949

THE GIANT 200-INCH HALE TELESCOPE (See page 168)

PRINCIPAL CONTENTS

# YOU NEED CLIPS



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# PRACTICAL MECHANICS

*Owing to the paper shortage "The Cyclist," "Practical Motorist," and "Home Movies" are temporarily incorporated.*

Editor: F. J. CAMM

VOL. XVI MARCH, 1949 No. 185

# FAIR COMMENT

## By THE EDITOR

### Control Line Flying

A DEVELOPMENT of model aircraft flying of comparatively recent origin, and known as control line flying, is developing. It is not a form of model flying with which I agree. Our readers will have judged from recent articles the general principle of this new form of model flying, and it is therefore only necessary for us to say that the model powered by a miniature engine, a diesel or jet motor is fastened to the end of a control line, the other end of which is manipulated by the operator. I can understand why this system of model flying was introduced. Petrol models, even when fitted with a time-control switch, can fly considerable distances, usually quite outside the capacity of local flying fields. Once the model has left the operator's hands he has no further control over it, and can only rely upon his skill in pre-adjustment to ensure that the model does not land on the highway, into a tree or, worse, into the side of a building. Such accidents mean that an expensive model may be ruined and involve the owner in many hours of repair work.

For all that, there is little fascination in it, for an engine tied to a brick could be made to operate in exactly the same way. Few, if any, of the models designed for control line flying are capable of free flight. In fact, one wonders why engines are fitted at all, since they could be attached motorless to a control line, or to the end of a whirling arm, and made to perform exactly the same acrobatics as when powered. Certainly nothing can be learned from their flight except a certain knack in manœuvring the controls. They are, at best, expensive toys.

They can be dangerous as is shown by the accident at Stainforth last December, when a model flier was electrocuted because the control wires of his model came into contact with high tension overhead cables. This model had a 20in. wing span and a 2 c.c. diesel engine, and steel wire was used for the control. The model 'plane went under the high-tension wires, over the top and under again; there was a terrific blue flash and the operator was instantly killed. We do not suggest that the cause of this control line flying should be abolished, but we do insist that it is in need of more rigid control. The height of high tension power lines is about 25ft., and control lines may be anything up to 60ft. in length. We feel that we are performing a public service in issuing this warning: that on no account should any model aeroplane be flown where there are overhead wires. It has been suggested that a line such as a fishing line could be used with safety to fly such model aeroplanes, but even this is not safe, as in wet weather grass in fields is wet, and moisture in suspension in the atmosphere can very quickly turn this into a conductor of electricity. Indeed, no one should fly even a kite where there are electric overhead cables.

We think that the Society of Model Aeronautical Engineers should issue strong warnings to clubs on this matter, before the authorities step in and make the flying of power models illegal.

### Our Fountain Pen Competition

ELSEWHERE in this issue we print the result of our fountain pen competition, which has aroused an enormous amount of interest not only among our readers, but among pen manufacturers as well. It is likely that at least one of the winning designs will appear on the market. Next month we shall publish a further selection from the designs sent in. It will be seen that we have augmented the prize money, and in view of the large number of meritorious entries a number of consolation prizes have also been awarded.

### "Model Aeroplane Handbook"

THE new handbook upon which I have been engaged for the past two years has now been published under the title of the Model Aeroplane Handbook (12/6, by post 13/-, from George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2.). It is a book of 312 pages, containing 303 illustrations, and its subject matter includes: A Short History of Model Aeronautics; Principles of Design; Airscrews; Wings; Undercarriages; Folding Airscrews; Retractable Undercarriages; Fuselages; Elastic Motors; Gearing and Special Mechanisms; Making Model Wheels; Geared Winding Devices; Model Aeroplane Stability; Down-thrust; Model Petrol Engines; Adjusting Model Petrol Engines; Compressed Air Engines; How to Form and Run a Model Aero Club; F.A.I. and S.M.A.E. Rules; S.M.A.E. Competition Cups; A Lightweight Duration Model; A Wakefield Model; A Farman Type Model Monoplane; A Composite Model; Ornithopters—or Wing-flapping Models; A Low-wing Petrol Monoplane; A Duration Glider; Winch-launching Model Gliders; A Streamlined Wakefield Model; A Model Autogiro; A Super-duration Biplane; Flying Model Aeroplanes; A Flash Steam Plant; Model Diesel Engines; Weights of Wood; Piano Wire Sizes; Area and Weights; New Schedule of British Records; Index. It will be noted that the book does not include information on control line flying, in view of the warning issued above, and because I do not feel that this is a form of model flying which should be encouraged.

### Fog

AS with the pen competition, a large number of suggestions have been made for circumventing this age-old evil. It really is astonishing that in the year 1949, with all the advances which are being made in the world of science, we should be plagued by traffic delays on the sea, on land and in the air, and that so many fatal accidents should be caused by it. We have very few foggy days in this country in the course of a year, and it would seem once the fog has passed nobody bothers about it until the next natural blackout occurs. Fog not only costs lives, but also hundreds of thousands of pounds a year in lost time. During the war, upon the insistence of Mr. Churchill, Fido (Fog Investigation, Dispersal of) was introduced at one of our aerodromes, and it successfully dispersed fog over a local area. It was, however, enormously expensive. Could not people be organised as they were for A.R.P. work during the war to guide travellers who have lost their way? I am certain that the cycling organisations, the boy scouts and similar bodies would co-operate.

The judges are carefully investigating the entries, and I hope to publish a selection next month.

### The Radar Association

THE Radar Association, formed to band together all those associated with the production and operation of this modern boon, recently held its annual foregathering at the Porchester Hall. As a life member of this association I take a keen interest in its development, and I am glad to notice the great increase in its membership which now exceeds 3,000 from a modest start of about 200. At its inaugural meeting I expressed in a speech the view that it could not for ever survive on nostalgic war memories and that members could not be held to an association for very long once the war had lapsed into the limbo of forgotten things.

For this reason I am pleased to see that they have formed a technical committee, whose duty it will be to upgrade the association and to place it on a plane comparable with other learned societies. It numbers amongst its membership almost every individual whose name is associated with radar.

Sir Robert Watson-Watt, who had so much to do with radar in its early days, was the guest speaker. Any reader of this journal concerned with radar is entitled to membership, and I shall be glad to put him into touch with the secretary.

# The New Hale Telescope

## Wonders of the New 200-inch Telescope on Mount Palomar, Southern California

By HAROLD J. SHEPSTONE, F.R.G.S.

*The observatory building, showing dome partially opened revealing the 200-inch telescope. The dome, which revolves on a circular track, is 137 feet in diameter and 135 feet high, and has a total weight of 1,000 tons.*

THE successful completion of the much talked of 200-inch telescope in its home on mile-high Mount Palomar, in Southern California, marks the finish of a great enterprise. It is to be known as the Hale Telescope after the late Dr. George E. Hale, Director of the Mount Wilson Observatory. The new astronomical giant was largely due to his vision, foresight and energy.

It was some twenty years ago that work was begun upon the instrument, though it should be added that all work upon it was suspended during the war years. In the diameter of its eye-piece, in size and weight, and in a host of other details, it has set up interesting records. All told, it has entailed an expenditure of £1,310,000. This is £110,000 more than the original Rockefeller grant, due to rising costs of material and labour and costs of maintenance during the war years.

Although the great eye-piece stands complete it is not expected to be put into sustained use till well into the spring. Much work still remains to be done in finishing, testing and adjusting the many delicate instruments that will be used in conjunction with it, such, for instance, as the spectrograph equipment.

Mount Palomar was selected as a site for the new telescope because here the sky is particularly clear. The peak rises to a height of 6,126 feet and is well covered with trees and vegetation. It has been a favourite camping site. It lies some 75 miles by road from San Diego.

There are three observatories—the larger one housing the 200-inch instrument, another the 48-inch Schmidt telescope, and a third an 18-inch Schmidt. The Schmidts are actually wide-angle cameras. The field which they can cover is much greater than that possible with the great telescope. The 48-inch Schmidt, now nearing completion, will in many ways serve as a scout for the larger instrument and will be used a great deal to determine what the larger instrument is to observe.

In addition to the observatories there are cottages for the observatory personnel, a large house called the "Monastery," where astronomers stay when on the mountain, and Utility Hill. This latter is the site for the mountain's own power plant, water storage system, machine shop, etc. During the busy days of construction Mount Palomar boasted its own school for the children of the workmen, recreation hall, dining hall and work camp.

### The 200-inch Mirror

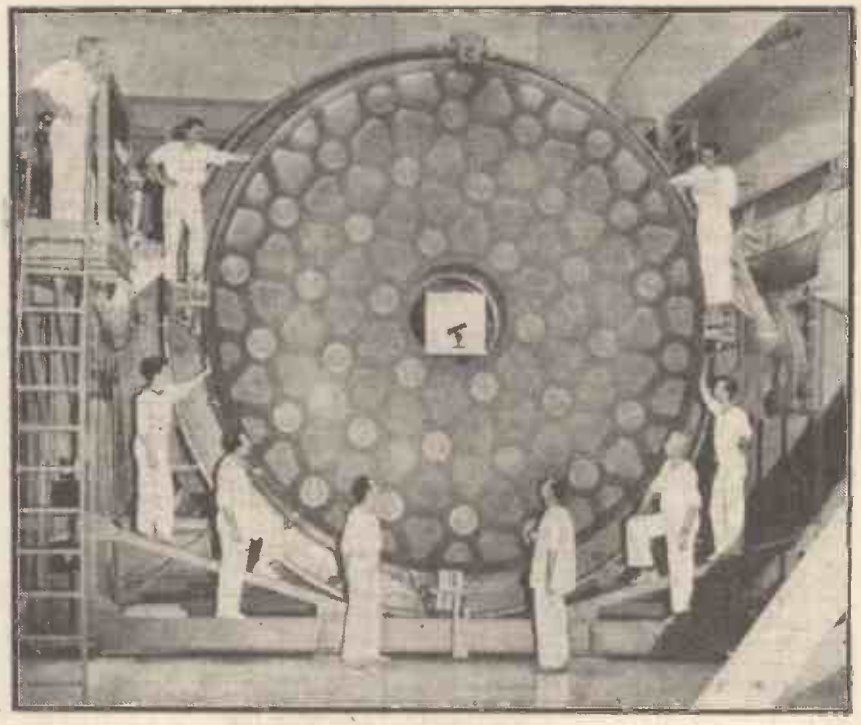
The mirror is of Pyrex glass, and when cast it weighed 20 tons. Seven years were spent in grinding and polishing it during which 5¼ tons of glass was removed, the weight of the finished eye-piece being 14¾ tons. It is approximately 24 inches thick at the edges and 20¼ inches at the centre. Its surface is ground and polished to an accuracy of two-millionths of an inch of a perfect paraboloid (concave) surface. It has a hole in the centre 40 inches in diameter. This is exactly the size of the world's largest refractor lens in the Yerkes Observatory at Chicago. This hole was necessary to provide for the Cassegrain focus, one of the three observation stations. It does not affect the utility of the mirror.

The mirror was cast with a ribbed back. This was done to save weight and to allow for a new type of support system which was required for a disc of such large size. The 100-inch mirror in the telescope at Mount Wilson is cast solid, as were all other previous mirrors.

The mirror is supported at 36 different points on the back of the disc. Each of the support points is an intricate mechanism in itself, each having some 1,100 parts. These support points are so designed that, by a system of levers and balances, each support mechanism automatically adjusts itself as the mirror is moved to various positions so that the proper stresses and strains are compensated for and the mirror will always hold the desired shape. Each of these 36 support mechanisms must be properly adjusted before the telescope is ready for use.

### Optical Range

This colossus of telescopes is of the reflecting type. It has only mirrors, no lenses.



*The 200-inch mirror. Our illustration depicts the back of the disc, which has been ribbed in geometrical patterns to reduce weight. After being ground and polished, during which 5¼ tons of glass was removed, it weighed 14¾ tons. In the centre hole is shown an exact replica of Newton's first telescope.*

In reality it is a huge camera with which astronomers will take pictures of stars and other heavenly bodies. You can't "look through it," although visual observations can be made by looking at images reflected in the mirror. This is done by placing an eyepiece (really a microscope) at the focus at which you are observing. It will never be used in this manner, however, for research. The optical range of the telescope is approximately one billion light years (a light year is the distance light travels at 186,000 miles a second for one year). This is twice the distance possible with the 100-inch instrument at Mount Wilson.

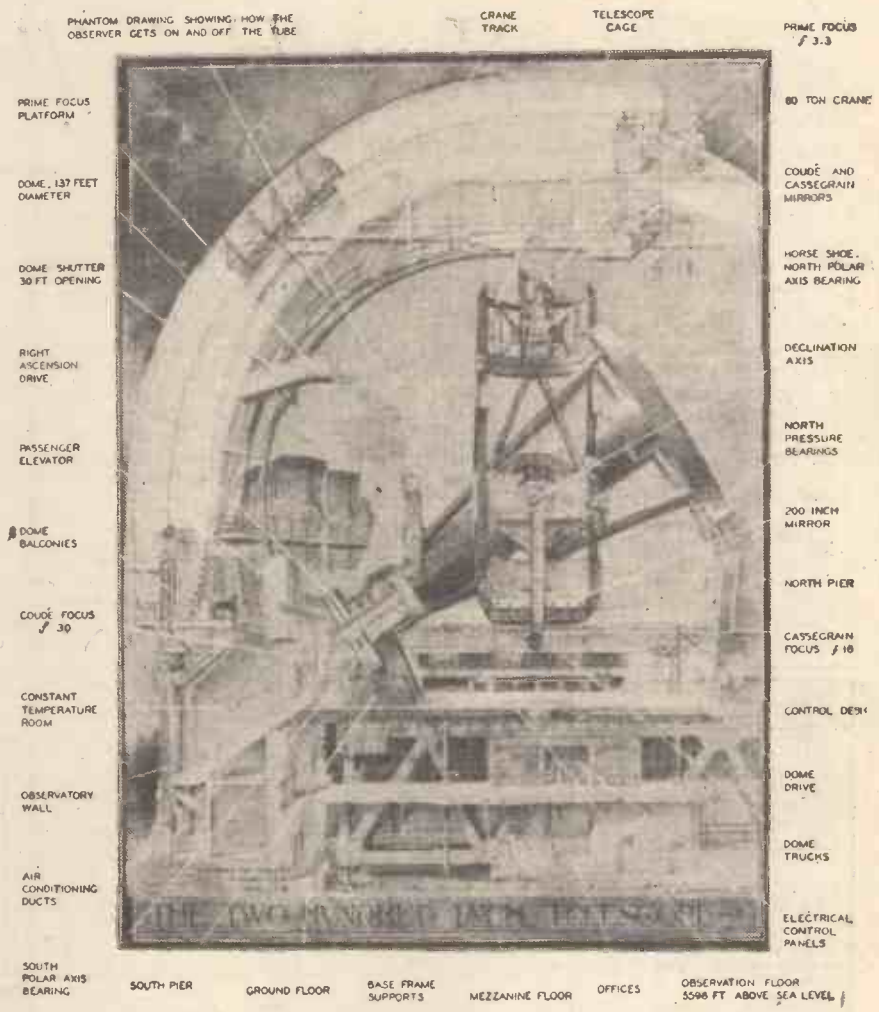
The two main parts of the telescope, the yoke and the tube, are supported on a base frame which is independent of the building. The yoke is fashioned of steel tubular girders and has a weight of 165 tons. The tube weighs 75 tons. The focal length of the instrument is 55 feet and its combined weight no less than 500 tons.

The 200-inch telescope is the only one in the world in which an observer actually rides while working. Inside the upper end of the tube is a prime focus observer's house in which the astronomer works and rides with the telescope. It is at this focus that the principal photographic work is done.

### Control System

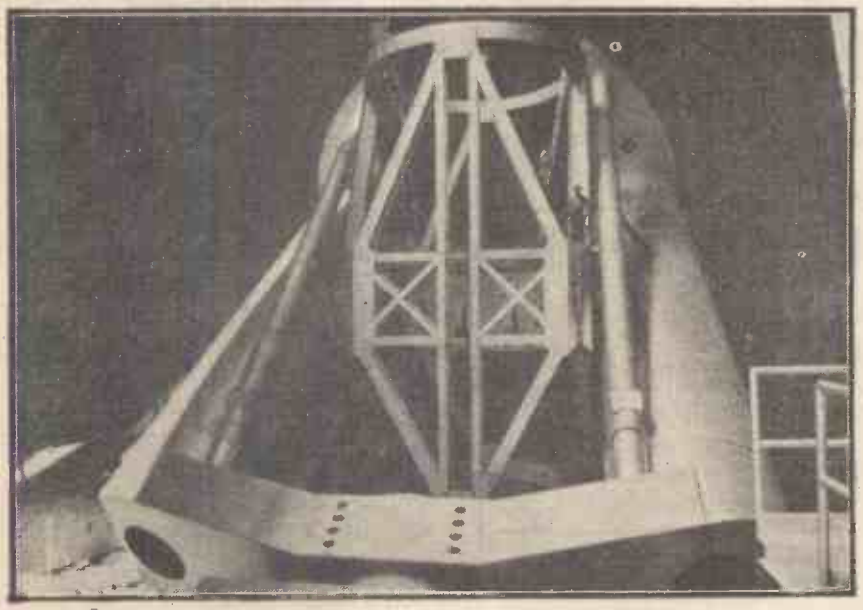
The telescope has the most elaborate control system ever used by astronomers. It has an electric remote indicating system of right ascension (moving yoke from east to west) and declination (moving of tube from zenith to horizon). At a control desk located on the observation floor, an astronomer's assistant can control the huge instrument. He can dial any star position desired, press a button and the telescope will move to that position automatically and begin following the object across the skies.

This automatic setting system is accurate to less than one second of arc. In addition to controlling right ascension and declination movements, it also has numerous switches for energising other devices, and also indicators giving the zenith angle of the telescope, position of the wind screen, rates of motion of right ascension and declination, the focus position, sidereal and Pacific standard time.




*A cross-sectional drawing of the 200-inch telescope with marginal identifications.*

Six flexible cables totalling 450 conductors carry the power from the buildings to motors and telescope controls, and the observatory has more than 400 miles of wiring.



*Some of the parts of the giant telescope can be seen here during assembly. Note the size, compared with the man standing on the girder. The total weight of the instrument when fully assembled is about 500 tons.*

This giant piece of mechanism for probing the secrets of the heavens is expected to be the means of solving many problems which have for long baffled scientists, such as the size of the universe, whether it is expanding as some think it is, and whether the sun, on which we depend for light and heat, is slowly dying. Then we have a lot to learn about the distant stars, particularly their chemical elements. This is important as it bears directly on two very fundamental problems—the source of stellar energy and the origin of chemical elements.

### Probing the Secrets of Mars

While the new sky-piercer will be directed chiefly to a study of the stars and nebulæ it will be used also for observation of the planets. It is expected to decide the controversy over whether there are, or are not, canals on Mars. It is capable of gathering enough light to make it possible for the first time to take a photograph of the surface of Mars which would disclose the so-called canals if they exist. If they are found to exist it will mean that intelligent life exists on Mars now or has existed in the past.

The astronomers at Palomar are following the American principle of allowing visitors to the observatory. It is open free to the public daily, from 9 a.m. to 4.30 p.m. There is a visitors' gallery, a glass-enclosed chamber, from which the entire telescope can be viewed.

# A Small Mains Transformer

## Constructional Details of an Efficient Instrument

By E. S. BROWN

THE small mains transformer which is described in this article is very suitable for operating the PRACTICAL MECHANICS electric door chimes. As it provides a reliable and economical source of current it will also be found useful in running small motors, and in providing low-power illumination for dark cupboards, etc. The transformer is of a very sturdy and robust design, giving an output of approxi-

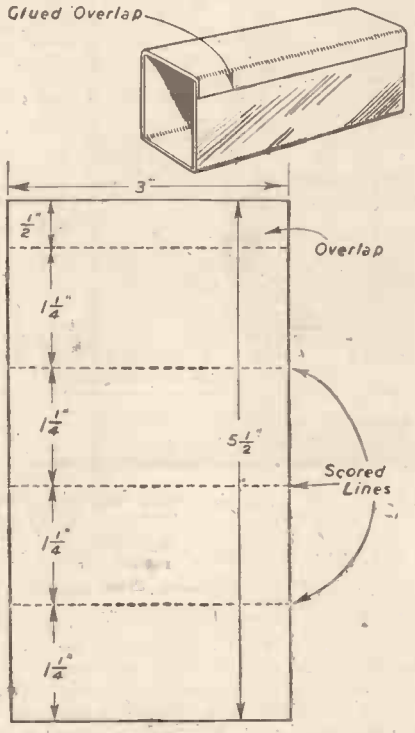



*Fig. 1.—The finished former, and dimensioned cardboard blank for making it.*

mately 50 watts at 12 volts 4 amps on a 230/250 volt 50-cycle A.C. supply.

When the transformer is used in conjunction with the electric door chimes the current consumption is negligible. This is due to the "balancing" or self-regulating properties of the transformer, whereby the mains input to the primary winding is governed by the working output of the secondary windings. This self-regulating feature can be briefly explained as follows: When the transformer is working with an open secondary circuit, an induced E.M.F. occurs in the primary windings nearly equal to and in the reverse direction to that of the alternating supply current. This results in an extremely effective restrictor or "choke," limiting the flow of current through the windings to very small amounts. This flow of current is just sufficient to provide the core-flux and to overcome the natural resistance of the windings. Upon the closing of the secondary circuit, the magnetic flux is reduced, resulting in a corresponding decrease in the primary E.M.F. This permits an increase in the flow of the supplying current in proportion to that demanded by the output of the secondary circuit. It will be understood, therefore, that when the transformer is only used intermittently, as in the case of the door chimes, the current consumed will be very small indeed.

The first essential in making the transformer is to obtain suitable core stampings. These may be obtained from Messrs. Geo. L. Scott & Co., Ltd., Cromwell Road, Ellesmere Port, Cheshire. Exactly 72 pairs of No. 25a stampings in Stantranis No. 1 .014in. thick material are required, price 8s. 6d. plus 1s. 6d. for postage and package charges.

### Coil Former

Having obtained the stampings, a coil former is made by cutting a fairly stiff piece of cardboard 3in. long by 5½in. wide. Four lines are scribed out down the length of the card, each line being 1¼in. equidistant. The cardboard is then carefully bent to the required shape and glued in position along

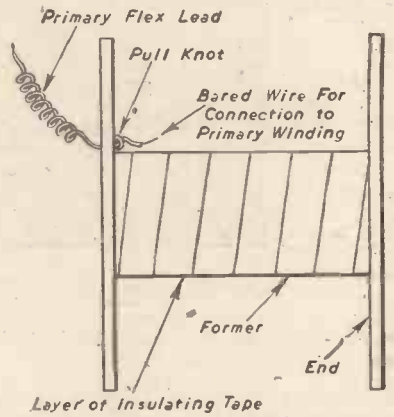



*Fig. 2.—The coil former ready for winding.*

the overlap. (See sketch, Fig. 1.) When made, the former must measure 3in. long by 1¼in. internal square.

Two 3½in. squared former ends are next required. These may be made from cardboard, thin plywood, or fibre-board. Two square-shaped holes are cut in both ends to take the former, which is then securely glued in position. The entire former assembly is then given a fairly liberal application of

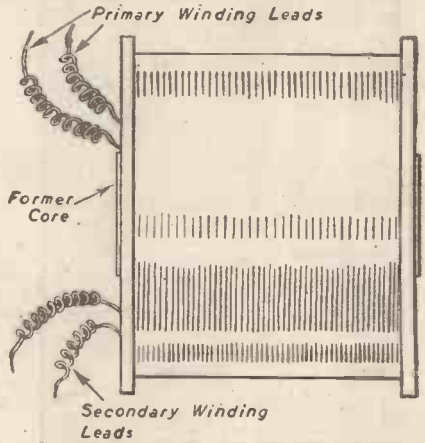



*Fig. 3.—The finished windings. Note.—The former core should be flush with the transformer ends, but is illustrated projecting slightly to show the relative position of the leads.*

*A three-quarter view of the completed transformer.*

shellac varnish, and, when dry, a layer of insulating tape is evenly applied around the former.

### Primary Winding

The primary winding comprises 1,600 turns of No. 32 S.W.G. single silk-covered enamelled wire. Should there be difficulty in obtaining the silk-covered variety, ordinary enamelled wire may be used, but the former kind is to be preferred owing to its superior insulating qualities. As a guide, the amount of wire that will be required for the primary winding will be approximately 8oz.

To commence the winding, make a small hole in one of the former ends as near to the former as possible, and pass a 6in. length of flex through, making a pull-knot 1in. from the end of same (Fig. 2). Solder the end of the flex and the commencement of the primary winding together, using a non-acid type of flux, and apply a layer of insulating tape over the join. Gently pull the flex back until further movement is prevented by the pull knot, then commence winding. The winding must be done tightly and evenly, and after every row should be coated with shellac varnish. Interpose every alternate layer with a thin sheet of paper impregnated with either wax or shellac. Particular attention should be given to see that the paper well covers the extreme ends of the windings, and if the ends of the paper are previously snipped along for a short distance with a pair of scissors, it will be found that this will considerably facilitate matters.

When the winding is completed, a further hole is made in the former end, and a 6in. length of flex is introduced; this is secured

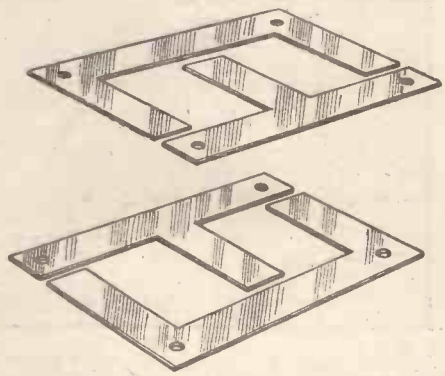


*Fig. 4.—Method of assembling the transformer stampings in alternate layers.*

with a pull knot as previously, then soldered to the end of the winding, finally applying insulating tape over the join.

After a final application of shellac varnish, the coil should be put aside in a warm place to thoroughly and completely dry out. An ideal place is an oven with a low heat setting, but care should be taken to see that the methylated spirit vapour which is driven out of the coil does not ignite and damage the coil assembly.

*Side elevation of the transformer showing the general layout.*

### Secondary Winding

When the coil is dry, a layer of insulating tape is applied over the primary windings, in preparation for the secondary windings. The secondary windings comprise 85 turns of No. 22 S.W.G. double cotton-covered copper wire. Approximately 4oz. will be required. The winding is commenced by making a small hole in the other side of the former end, passing 6in. of the winding through, then winding the wire on evenly and tightly until the requisite number of turns are made. A further small hole is made in the former end, and 6in. of the free end of the winding is pulled through the hole (Fig. 3). Insulating tape is then applied around the secondary coil windings, and a piece of thin cardboard or leather-cloth is finally applied to enhance the finished appearance of the coil.

### Stampings

The transformer stampings are next inserted in the former in alternate layers, to ensure that the abutting edges of one layer are covered by those of the next. (See Fig. 4.) It will also be noticed that one side of the stampings is coated with an insulating material. The stampings should be inserted with the insulated sides facing in one direction, to ensure that the stampings are all individually insulated.

It is probable that the last few stampings may be slightly difficult to insert. This difficulty may be overcome by gently tapping with a light hammer until all the stampings are into position; but do not force matters, as damage may be done to both the former and the stampings. When the stampings are correctly positioned the four small corner holes in same will be concentric. If they are not, the stampings should be gently tapped in the direction indicated until the alignment is correct.

### Clamping Strips

Four iron or brass clamping strips are next required, made to the shape and dimensions indicated in (Fig. 5). These are bolted to the stampings by suitably sized nuts and bolts, and will ensure a very strong and rigid assembly. The switchboard is made from a piece of thin plywood or similar material 4in. by 5½in. This is secured to the iron or brass side pieces by small screws applied from the underside, and care should be taken that the screws are not too long, and so penetrate through the wood. The switchboard may be left in its natural condition or painted with a glossy enamel. A switch is fitted on the primary circuit, the necessary hole, of course, being previously drilled in the switchboard for the primary wire and mains flex. This flex should be of the best quality and of sufficient length to enable connection to be made with the mains fuse-box.

### For Door Chimes

The secondary wires are taken through a hole in the switchboard and connected to a plug-socket, and the door chimes connecting wires are attached to the plug. If one desires to run small lights from the transformer, the necessary leads may be connected in parallel with those of the door chimes. Should the full output of the transformer be required, as for instance in running small motors, etc., it is a simple matter to break the existing circuit by the removal of the plug, and to connect up the motor by the insertion of another.

In order to take full advantage of the power of the transformer, the solenoid coil of the door chimes may be rewound with 3 oz. of No. 22 double cotton-covered wire. The original winding was made to conserve battery power as much as possible, but when the chimes are actuated with the above transformer, this economy does not apply.

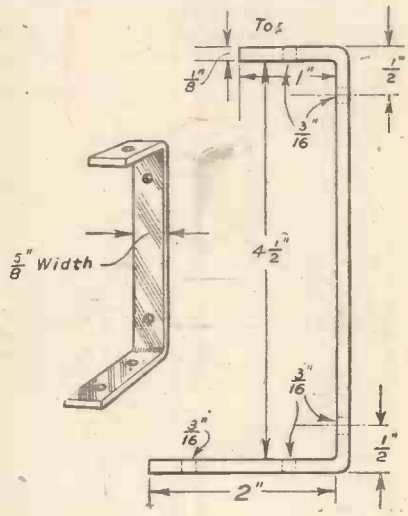



*Fig. 5.—Details of transformer clamping strips.*

Many readers may find that the voltage of the transformer is rather high for uses not connected with the door chimes. In those circumstances the secondary winding may be tapped at every twenty-eighth coil thus giving three alternative voltages of approximately four, eight and twelve. In this case the plug and socket connector can be dispensed with and replaced with suitable terminals.

## A Revolutionary M.G.B.

HAVING completed successful trials and recently off the secret list for the second time in her career, the 110ft. triple-screw M.G.B. 2009—one of a flotilla originally built in 1941 by Messrs. Camper and Nicholson, Ltd., as anti-submarine boats for the Turkish Government, but subsequently taken over by the British Admiralty and used during the war for bringing ball bearings and high-grade steel components from Sweden to this country—is now fitted with a 2,500 s.h.p. Metropolitan-Vickers gas turbine driving the central screw while the two existing 1,250 s.h.p. petrol engines operate the port and starboard screws.

The gas turbine plant, fitted by Messrs. Camper and Nicholson, Ltd., consists of a compressor, a combustion chamber, a compressor turbine and a power turbine. The only function of the compressor turbine is to drive the compressor. The combustion chamber is of the annular type and fuel is introduced through 20 jets circumferentially spaced round the chamber. After passing through the compressor turbine the products of combustion are expanded through a power turbine which is on a separate shaft from the compressor turbine and which drives the propeller through the reduction gear.

At the heart of the ignition system are eight six-volt Exide battery units. Apart from their main duty of starting the three high-powered engines, they are also called upon to turn over two petrol engines for auxiliary and communications circuits.

*The M.G.B. 2009 at speed during her trials.*

# An Adjustable Bench-lamp

## An Inexpensive Lighting Unit for the Amateur's Work-bench

By STANLEY BRASIER

THE adjustable and portable bench lamp illustrated is a useful adjunct on the test-bench as it permits of local light in inaccessible places whilst servicing a radio receiver, and for other work.

The complete lamp was constructed at a cost of about four shillings and the work entailed is not difficult. Construction is self-explanatory by reference to the accompanying drawings. The base is the only part that may be slightly difficult to obtain. A heavy base of any shape is suitable, particularly that of a hat or dress stand. It is often possible to obtain one that has been dis-

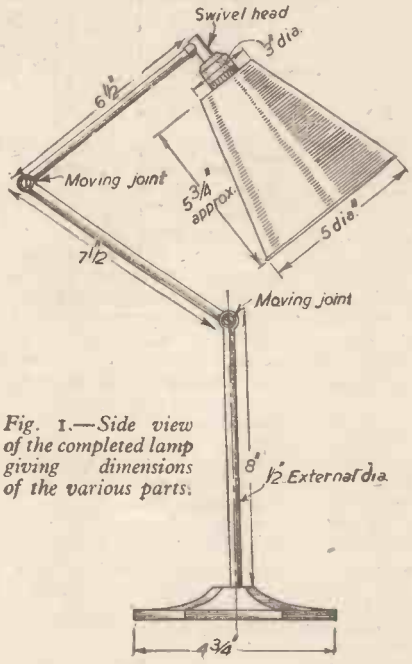



*Fig. 1.—Side view of the completed lamp giving dimensions of the various parts.*

carded by a milliners' or general drapers' shop at a modest cost. As a last resource a stout tin lid of suitable size may be used. This is filled with molten lead and allowed to set. The lid is turned face up and may be easily drilled in the centre to receive the main post.

### Preparing the Tubing

Practically any metal tubing of ¼in. external diameter is suitable. If copper is obtainable so much the better as it is easier to work. The various steps in the forming of the movable joints are shown in the drawings. First, a saw-cut is made down the centre of the end of the tubing (Fig. 2(a) ). The ends are then carefully flattened in a vice or by hammering (Fig. 2(b) ). Next, trim the ends to a half-circle and drill a 2 B.A. clearance hole right through (Fig. 2(c) ). Finally, the end is opened out to form a fork similar to that shown in Fig 2(d). This procedure is carried out on one end of the lower tube, both ends of the middle tube and one end of the upper tube. It may be advisable to soften the ends by annealing.

The sections are then ready for assembly and the method is shown in Fig. 3. The spring washers are essential in order to provide a stable, but movable, joint. The spacer, or distance piece, is a length of any tube that will slip over a 2 B.A. bolt.

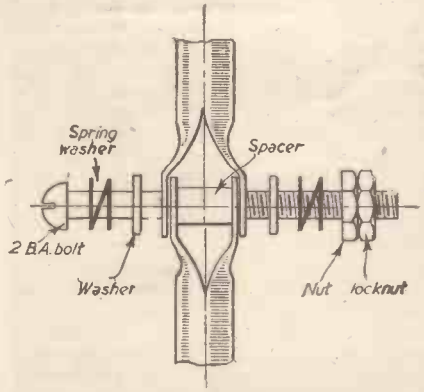



*Fig. 3.—The method of assembly of the moving joints.*

### The Swivel Head

The small angle piece which connects the lamp-holder to the upper tube and forms the swivel head is shown in Fig. 4. A short length of tubing (A) of the same diameter is blocked at one end by soldering on a disc of metal. The other end is threaded to take the screw thread in a lamp-holder. Alternatively,

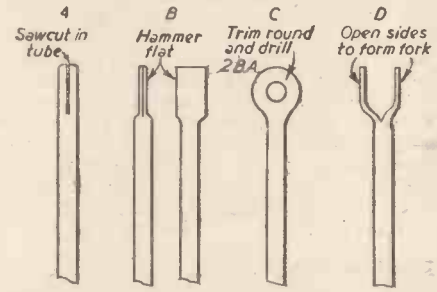



*Fig. 2.—The four stages in the formation of the tube joints.*

threaded tube made to screw into the lamp-holder may be purchased at any popular stores. It is then a simple matter to solder a short length of it to the tube A. A short length of tubing (B) is filed out at one end to fit the tube A at right angles. C is a 1½in. length of tubing of a diameter that permits a snug fit into B. Two saw-cuts an inch long are made down the tube so that four tongues are formed. These are opened slightly, thus affording a good spring fit into the uppermost tube of the lamp assembly. Then, referring to Fig. 4, C is soldered into B and B to A.

### Making the Shade

The shade is made from light gauge tinplate or any thin metal which can be

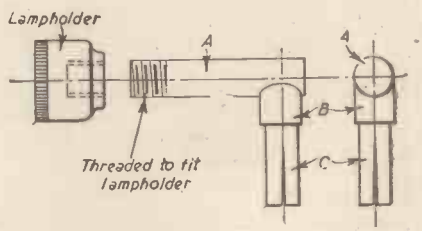
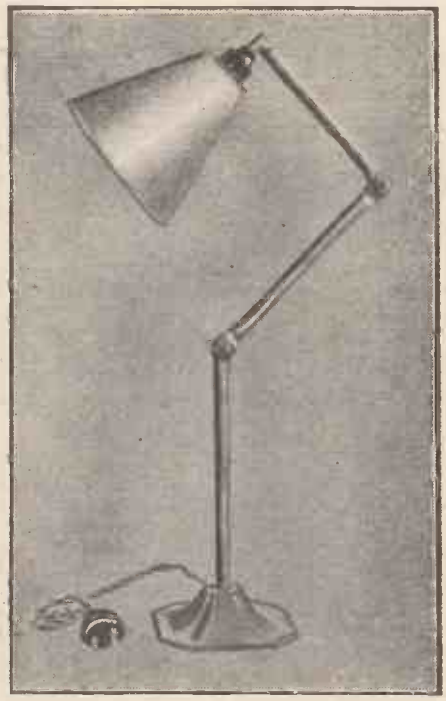



*Fig. 4.—The swivel-head joint.*



*The completed bench-lamp ready for use.*

soldered. The setting out of the flat shape is shown in Fig. 5, and, after bending to the desired shape, the straight sides are slightly overlapped and soldered. A circle of metal is soldered to the top of the shade having first cut a hole to receive the lamp-holder. At the lower edge of the shade a circle of thick wire is formed and soldered to it. Before cutting the metal it is advisable to make a template of thin cardboard so that the desired ultimate shape may be assessed.

No switch is incorporated in the lamp but holders with switch are available if desired.

### Finishing

The finished lamp was given a coat of grey cellulose paint and the inside of the shade finished in flat white.

When wiring the lamp, the flex should be taken one complete turn around the spacers at the movable joints. A little "slack" should be allowed inside the tubing to allow for movement when adjusting.

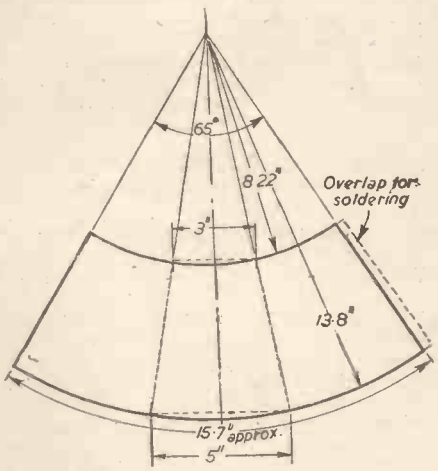



*Fig. 5.—The setting out of the cardboard blank for forming the shade.*

# Making an Ellipsograph

## Details of a Useful Instrument Made in Perspex

By T. HADFIELD

*The ellipsograph in use.*

ONE of the most difficult figures for a draughtsman to draw is, without doubt, an ellipse of a true shape. The usual method is by an intricate construction necessary to get the centres and radii of two arcs. This at the best can only produce an approximation of the true elliptical shape, and when in extreme cases it is necessary to construct them of almost flat or circular form it is invariably found that the finished shape has either pointed ends or bulges, which detract from the appearance of the shape. It should be borne in mind that a true ellipse may vary from a straight line to a circle, and it is with this fact in mind that the instrument to be described was designed.

There are several instruments on the market designed to produce ellipses, one of the oldest being the trammel method. This does give a true shape, but cannot be used for small ellipses that are less than the outside dimensions of the slides of the instrument. As it is usually the problem of drawing comparatively small ellipses that confronts the draughtsman, obviously this method is not of general practical use.

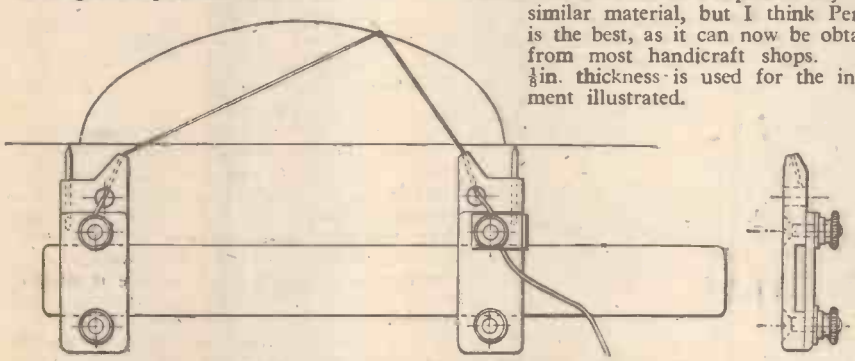


*Fig. 1.—Front and end views of the complete instrument.*

Another well-known method is with two pins and a piece of string, as shown in Fig. 7, and this does give a true shape, and not an approximation. This principle is the one developed in the simple instrument shown in Fig. 1. It is easy to adjust the length of the cord and the position of the pins for varying sizes and shapes of ellipses, and with a fine cord ellipses can be drawn as small as ½in. major axis, as well as any size larger according to the length of the connecting piece.

### Perspex Construction

Fig. 1 shows the complete instrument, which can be made in Perspex or any other similar material, but I think Perspex is the best, as it can now be obtained from most handicraft shops. The ⅛in. thickness is used for the instrument illustrated.

Perhaps a few hints will not be out of place for anyone who is new to this material. Perspex can easily be drilled and cut with the standard twist drills and hack saws, but see that the drills are sharp, and take great care in breaking through as it may pick up and burst the piece; therefore, every precaution should be taken when feeding the drill through the material. In gripping in the vice, etc., use a piece of thick paper next to the Perspex so as not to damage the highly polished surface, as it is soon scratched or cracked, being of a very brittle nature.

The sliding pieces, Fig. 2, are built up, the pieces of Perspex being cemented together. To make this cement, small pieces of Perspex are dissolved in trichorethylene (this is now used extensively for de-greasing, and can be obtained at most chemists) to make a jelly-like cement. Both pieces to be cemented together are well coated with cement and pressed together, and a small weight placed on them and left for about 12 hours to thoroughly harden. The holes can then be drilled and the edges filed up, sandpapered and polished with any metal polish. In making this part, Fig. 2, one is made as drawn, and one of the opposite hand. The faced marked X must be filed so that the connecting piece is gripped when the nut B is tightened. Fig. 3 is the cover plate; two will be required, and these can be drilled and polished to suit Fig. 2. The clip, Fig. 4, is made as shown from 20 g. brass and the cord is clamped under it. The pointed steel pin, Fig. 5, must be a push fit, but if any slack is apparent after drilling it can be smeared with cement before inserting. The plain connecting piece H, Fig. 6, must be a good sliding fit, and can be made any length, according to the largest ellipses required to be drawn, but for general use, with a major axis of 6in., it will require to be 8in. long.

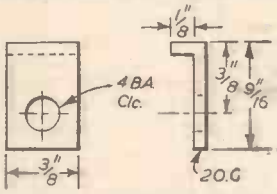



*Fig. 4.—Metal clip for movable sliding piece.*

*Fig. 5.—Pointed steel pin.*

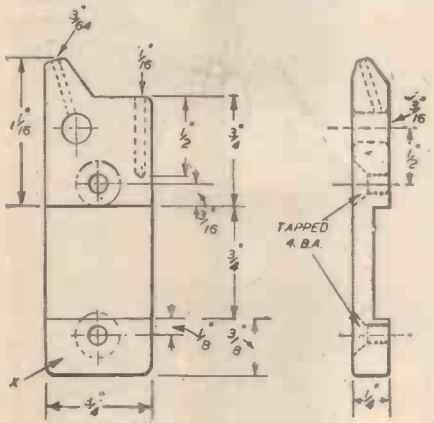



*Fig. 2.—Details of the sliding pieces.*

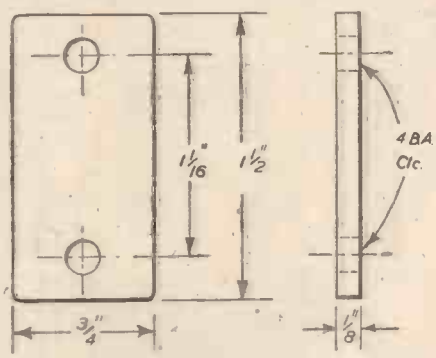



*Fig. 3.—Front and side views of cover plate.*

The cord must be fine and flexible and a piece of silk fishing-line is ideal for the job as it will not stretch. One end of the cord is permanently clamped under the nut C, threaded as shown, and then under the brass clip, Fig. 4. The nut D is permanently tightened, and only the right-hand piece is moved when setting.

**Using the Instrument**

In using the instrument to draw an ellipse, having been given the major and minor axes, Fig. 6 shows how to set it. Assuming EF is the major axis and GH the minor axis, with G as centre and OE (half major axis) as radius, make an arc cutting the major axis at X and Y. Place the instrument with pointers on the major axis and adjust the right-hand slider so that the outlets of the cord are just opposite each end of the major axis at E and F. Lock B and pull the cord tight and then lock A. Slacken B and move so that the two outlets of the cord are just opposite X and Y and lock B. If the instrument is held on the paper in this position the half of the ellipse can be drawn with a pencil sliding inside the cord and the line drawn will pass through E, G and F.

To draw a complete ellipse, it is set as above but raised on the two steel points that are on the major axis. By inclining the instrument it is quite easy to draw both halves, that is one half at each side, but care must be taken to see that the two lines meet neatly at the major axis.

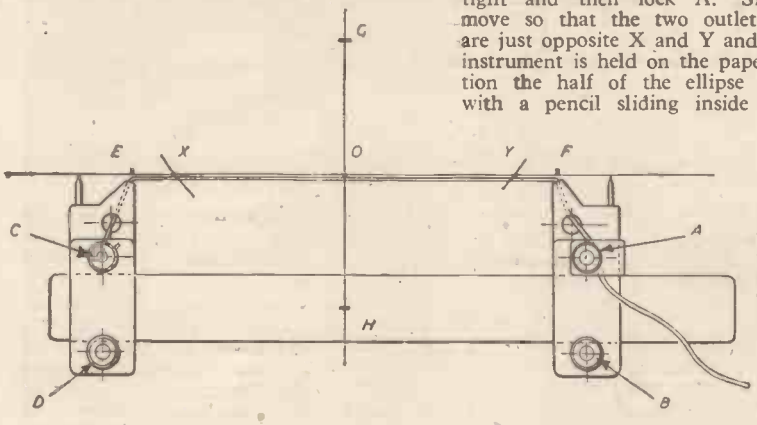



*Fig. 6 (Left).—How to set the instrument for drawing an ellipse.*

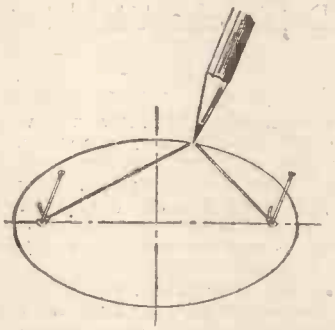


*Fig. 7—Drawing an ellipse with the aid of two pins and a piece of string.*

# New Electric Truck

ELECTRIC Road Vehicles whose power is derived from batteries have become more popular during the last few years, and although petrol rationing may have contributed to this popularity, the main influence has come from the cheapness of their fuel consumption and, compared with their petrol counterpart, the ease and simplicity of maintenance.

Electric retail delivery vans have become so common a sight on the streets that people have been asking why it is not possible to have an electrically run private car. Such a proposition has been rather dependent on the range required, and the size of battery to achieve this has not, until now, been an economic possibility.

The question of cost, too, has played a big part, since it has been necessary to purchase large and expensive traction batteries and the necessary charging plant to go with them.

Control has, till now, been a knotty problem; the step control method has the drawback that there is constant arcing, with the resultant burning and pitting of contacts. In order to achieve any smoothness of operation it has been necessary to employ resistances which themselves dissipate wastefully a large amount of energy in the form of heat.

Stopping and starting, too, has been a ready source of lost energy, for in the creation of forward movement energy is drained from the batteries and in so doing what is known as " kinetic energy " is created, which is then wasted into the brake shoes and drums of the vehicle when the brakes are applied.

On a commercial vehicle which suffers frequent stops, this energy drain is considerable. Having once attained maximum speed, however, the current required for its maintenance is comparatively small.

**A New Traction Circuit**

Lansing Bagnall, Ltd., of Worton Road, Isleworth, Middlesex, have, by the introduction of their new Electric Traction Circuit, brought about what may be termed a revolution in this field.

Battery vehicles are now a proposition for the private motorist—it is possible to run a private car, of equivalent size to the popular 8-h.p. petrol-driven counterpart, on a small traction battery. One charge will cost 6d., and a full 50 miles can be done on that charge.

By virtue of this new circuit, no separate charging board is required. Fitted to the vehicle is a lead and plug and it is necessary only to plug into the nearest mains power point, switch on, and charging is automatically taken care of with a tapering rate of charge; a safety device cutting out when fully charged.

This can, for convenience, be done at night when generating stations are off peak and large users of electric vehicles can obtain special charging rates.

You can visit your friends or drive to the office, or have an electric car at home to take the children to school, and to pay social calls. To increase the range whilst the car is waiting plug into a convenient power point, is boosting the batteries.

**Control Unit**

All this is made possible by one small unit, approximately one-fifth in size of the present type of electric control, which is placed near the motor; practically all electric wiring being kept to this unit, irrespective of vehicle layout. Connection to operating points is by mechanical cable.

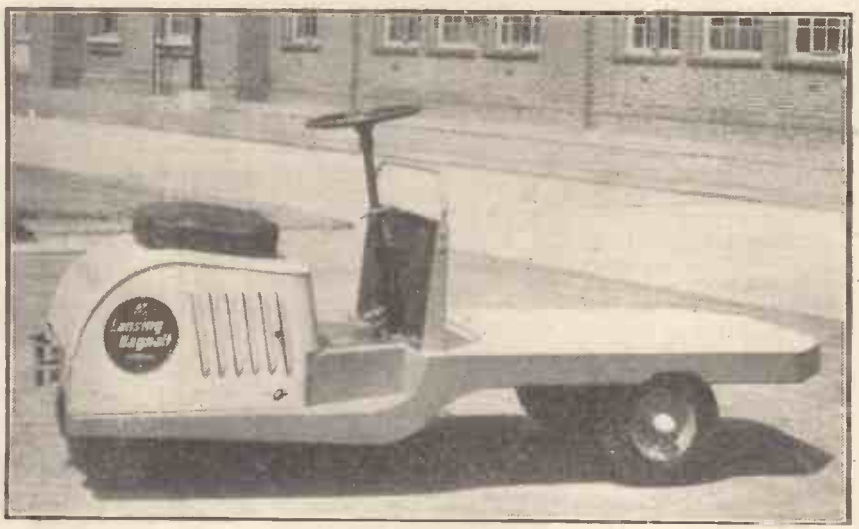
The conventional type of step control which has meant a definite number of speeds with a virtual jumping from speed to speed, is now replaced by one single accelerator pedal which, when depressed, gives a smooth and easy forward motion. Thus, from start to maximum, speed is infinitely variable.

An equally smooth reverse motion is obtained by a small switch, which is pre-selective in action, i.e., it may be put into reverse whilst going forward, but does not operate until the vehicle has stopped. This feature prevents abuse of the electrical and mechanical equipment.

**Overdrive Braking**

When travelling down hill, two advantages come into operation. First, by the gradual raising of the accelerator pedal speed is reduced smoothly, thus providing an overdrive braking effect previously enjoyed only by petrol-driven vehicles. Secondly, as this overdrive action comes into effect, so energy is regenerated back into the batteries.

With present forms of electric battery traction, stopping and starting account for from 25 per cent. to 35 per cent. of a battery's charge. Lansing Bagnall, Ltd., carried out a mileage test without stops on one set of batteries and followed this by a further test which included 110 stops and starts. By virtue of regeneration no reduction of mileage was shown in this second test.



*The new Lansing Bagnall battery-driven truck.*

# The Elements of Mechanics and Mechanisms—17

## The Siphon (Continued)

By F. J. CAMM



IT was shown last month that mercury cannot round the bend of a siphon tube if the bend is more than approximately 30in. higher than the level of the liquid in the tank in which it is immersed, because the downward air pressure of the liquid in the tank cannot support a column of mercury more than 30in. in height; and for the same reason water cannot be siphoned from one vessel to another if the top bend of the siphon tube is more than about 34ft. above the level of the water in the supply tank, because 34ft. is the approximate height of the water barometer. The siphon principle is used for transferring liquids from one vessel to another through any pipeline circuit, provided that the delivery end of the siphon tube is in a lower position than the supply end of the tube.

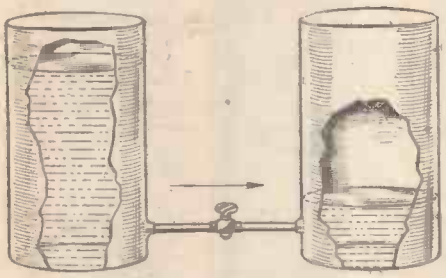


*Fig. 1.—An experiment which demonstrates the fact that water at different pressures in two vessels attains the same uniform pressure when allowed to do so.*

### Soxhlet Siphon

The Soxhlet extractor is a well-known siphon device, and in its laboratory form consists of a glass cylinder in which the material to be extracted is placed. The spirit or other liquid is boiled in a flask below the extractor, and its vapour passes up a tube situated at one side of the extractor and thence into an upper condensing device, from which the condensed liquid drops back into the central chamber.

The level of the condensed liquid continues to rise within the central chamber and simultaneously within a U-tube which communicates with the central chamber. When the liquid level rounds the bend of the U-tube siphonic action at once starts, and the central chamber is rapidly emptied of its liquid, which flows into the boiling flask.

This process or cycle continues, each cycle taking from 5 to 10 minutes. The result of this operation is that the liquid in the boiling flask becomes more and more concentrated in extracted matter which is dissolved out by the liquid in the central chamber and, of course, subsequently returned by siphon action to the boiling flask.

This principle is employed in chemical works concerned with the extraction of essential substances from natural objects. Another well known siphon application used by laboratory assistants delivers small amounts of liquid from a large supply tank or bottle. This latter is placed on a raised shelf and is provided with a cork through which passes a glass siphon tube, although sometimes it is made of metal. The lower limb of the tube terminates in the clip of a stop-cock (see Fig. 6, February issue). The liquid is very slowly drawn into the delivery tube so as to fill it, by sucking or by other means, after which the liquid will trickle out of the bottle by siphon action, every time the tap or clip is opened. By varying the size of the delivery tube and its orifice a fine control upon the rate of delivery can be obtained.

### Natural Siphons

Siphon action underlies quite a number of natural phenomena connected with springs and wells. Many springs run for a time, then stop, dry up, and subsequently again produce water abundantly. Frequently, the cause of these intermittent springs is to be found in a siphon action similar to the one illustrated last month. Within a hill or mountainside is situated a natural cavern or water cistern which is fed by rills running from higher levels. The natural outlet from the underground cistern or cavern takes the form of a U-tube. It is clear, in such circumstances, that siphon action will take place immediately the water-level within the cavern has risen to the level of the U-bend of the exit conduit. The natural cistern will at once commence to empty itself by siphon action and

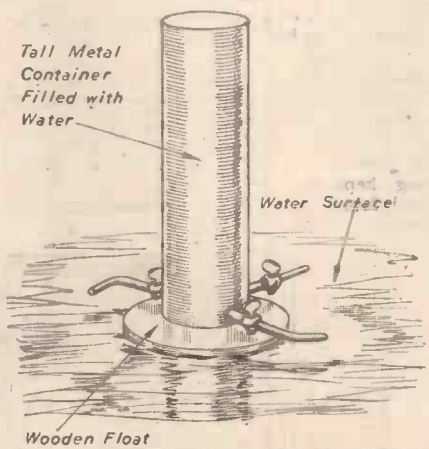



*Fig. 2.—A demonstration of motion being obtained by the unequal lateral pressure of a liquid.*

the spring or rivulet will commence to flow. When, after a time, the hillside cistern has emptied itself, the spring will dry up and it will not give forth water again until the natural cavern has again been charged up to siphon-level with water.

Sometimes, springs and rivulets of this nature never entirely cease to flow. In such instances, the explanation has frequently been found in the existence of a small, narrow-bore conduit leading from (or near) the lowest level of the hillside cistern, this conduit running into the main siphon channel from the cistern.

Now, in the above instance, it is obvious that so long as there is any water at all in the cistern it will always flow away via the narrow bottom-most channel. In rainy weather, however, the mountain cistern fills with water at a quicker rate than the small straight channel can empty it. Consequently, the water-level within the cavern rises. Ultimately, the water-level rises to the height of the U-bend of the siphon conduit. Immediately siphon action takes place, and the natural cistern empties itself by the "straight" channel and by the siphon conduit at one and the same time. Necessarily, the volume of water appearing at the spring or rivulet is much enhanced as a result of this dual emptying of the cistern. When, however, the cistern has emptied itself, siphon action ceases, and the smaller, bottom-most conduit again takes up the function of sole cistern discharge.

These and several other curious natural phenomena connected with springs and mountainside water-sources are all due to siphon action in one guise or another. Nature, indeed, uses the siphon principle equally as much as the modern industrial worker does, but, usually, the natural siphon gives rise to effects which are perplexing in the extreme to the uninitiated.

### Liquid Heads and Fluid Pressures

Fluid pressure is the force exerted by the fluid per unit area, and this is sometimes referred to as the intensity of pressure or pressure intensity. Presuming that the pressure is given in pounds and the area of the liquid in inches, then it follows that the intensity of pressure will be expressed in *pounds per square inch.*

Moreover, if the liquid is under a uniform pressure the intensity of pressure is:

$$P = \frac{x}{y} \text{ lb. per sq. in.}$$

where x is the total pressure in lb. acting on an area of y sq. in.

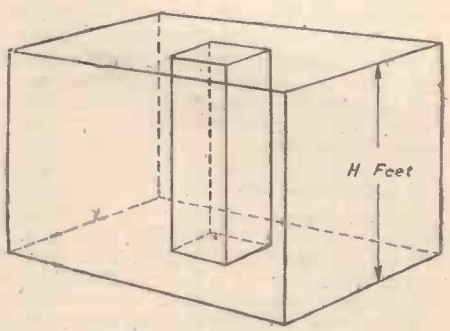



*Fig. 3.—A diagram illustrating the pressure-weight of liquids.*

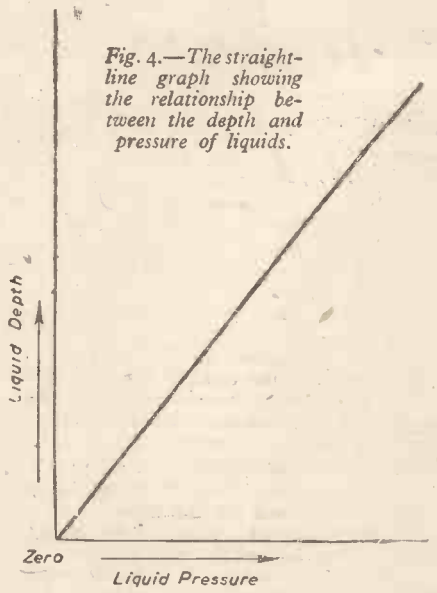



*Fig. 4.—The straight-line graph showing the relationship between the depth and pressure of liquids.*

The pressure on a liquid is uniformly distributed at any area or point of it, and if any part is subject to a slight increase of pressure that increase is immediately distributed to all other areas of the liquid.

Now the pressure of a liquid on the bottom of its containing vessel is the sum of the weight of the water divided by the area of the bottom of the vessel, plus the pressure of the atmosphere on the surface of the liquid. It is obvious that this pressure will be transmitted through the liquid to the bottom of the vessel.

If two vessels containing unequal depths of liquid are connected together by means of a tube, the pressure of the deeper will exceed the pressure of the shallower until the two water levels become equal. We have already seen by Pascal's law why this is.

### Unequal Pressure

As an experiment take a watertight metal vessel which is mounted upon a circular wooden base, suitably weighted so that the can is maintained in an upright position on the water, as shown in the diagram. Three short pipes with stop-cocks are fitted in the tin can near to its base. The first of these is a short straight length projecting horizontally, the other two pipes are disposed opposite each other, and have their ends turned obliquely downwards in opposite directions. They must, of course, be of identical length and weight.

Now float the vessel in a large tank of water and fill it to the top with water. If the stop-cock of the straight projecting pipe is open the water will escape in a jet into the tank, the reaction of the escaping water driving the floating vessel in a straight line through the water of the tank.

Now keep the stop-cock of the straight pipe closed, and open the stop-cocks of the curved pipes simultaneously. The reaction from the oppositely disposed water jets will impart rotary motion to the vessel.

Now, since a liquid is subjected to the pressure of its own weight it follows that the pressure increases with increasing depth of liquid. Assume that we have a vessel holding water to a depth of H feet (see diagram). Let the weight in lb. of 1 cu. foot water of water be $w$. The pressure exerted upon 1 sq. foot area on the floor of the vessel is equal to the weight of the rectangle or column of water which is resting directly on it. Therefore the total pressure on 1 sq. foot of the vessel is equal to $w$H. As the base of the rectangle has an area of 1 sq. foot this will equal the intensity of pressure.

Therefore:

$P = w$H lb. per sq. foot.

### Static Head

The pressure at any submerged area or point in a liquid is governed by the height of the free surface, or liquid level above that area. This height is known as the *static head*.

It should be clear from this that the intensity of liquid pressure on the sides of a vessel increases from zero at water level to $w$H at the bottom of the vessel, the pressure increase on the vessel's sides being uniform as illustrated by the graph.

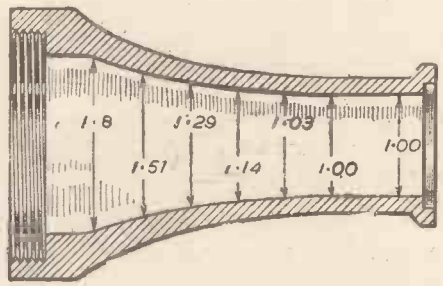



*Fig. 5.—Section of a fire-hose nozzle, showing the system of structural curvature adopted. The dimensions given represent relative diameters.*

The pressure of the atmosphere on the surface of the liquid in calculations of this sort is usually ignored. When it is desired to know the *absolute pressure* the prevailing barometric pressure is added to the intensity of pressure at any point in the liquid.

### Piezometer Tube

The pressure of water or of any other liquid in a vessel or a pipe line can readily be estimated by means of a piezometer tube, which, in its simplest form, comprises merely a vertical glass tube which is inserted into the vessel or pipe line. The piezometer or pressure tube need not be straight. It can be curved and even run for some distance in a horizontal position. The vertical height of the liquid in the piezometer tube is a measure of the pressure intensity of liquid within the vessel or pipe line.

The pressure head at any point in a liquid can be defined as the vertical distance between that point and the *free surface* of the liquid. This pressure head, H, is equal to $\frac{p}{w}$ where p is the pressure per sq. ft. and w is the weight of 1 cu. ft. of the liquid.

In exactly the same way, the pressure head at any point in a moving liquid, as, for example, water in a hydrant, can be represented by the same expression, $\frac{p}{w}$, p, in this instance, being the pressure in lb. per sq. ft. of the liquid, and w, as before, being the weight per cu. ft. of the liquid.

Not infrequently, it is desired to estimate the total pressure on a vertical surface immersed in a liquid. Since the static pressure of a liquid varies at different points in its vertical depth, it follows that the pressure on all points of the immersed surface cannot be uniform. It can, however, be proved by a mathematical demonstration, which it is not proposed to detail here, that the total pressure of liquid on an immersed surface is equal to the area of the surface multiplied by the intensity of liquid pressure at the centre of the area of that surface. This holds good for all surfaces immersed in liquids, no matter whether such surfaces are flat or curved, provided that they are vertical ones, and it forms a useful means of estimating the total pressure of liquid on a lock-gate, a sluice-door or any other similar vertical surface.

In view of the fact that the intensity of pressure on an immersed surface is not uniform but increases directly with depth of immersion, it follows that the liquid pressure on the immersed surface will be greater over the lower portion of that surface than it will be over the higher portion. The resultant liquid pressure, therefore, will tend to act at some lower point or area of the immersed surface. This latter point is commonly referred to as the *centre of pressure*. It is always situated below the centre of the area of the submerged surface.

Because liquids exert pressure in all directions, it follows that liquids must exert an upwards pressure as well as a downwards one. Upon such a fact rests the phenomenon of buoyancy.

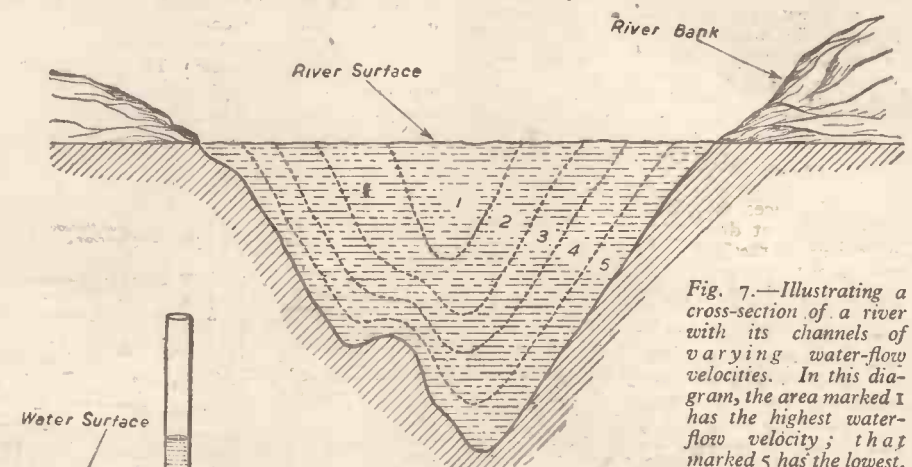



*Fig. 7.—Illustrating a cross-section of a river with its channels of varying water-flow velocities. In this diagram, the area marked 1 has the highest water-flow velocity; that marked 5 has the lowest.*

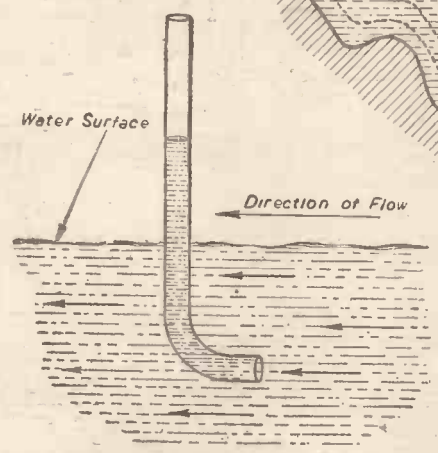


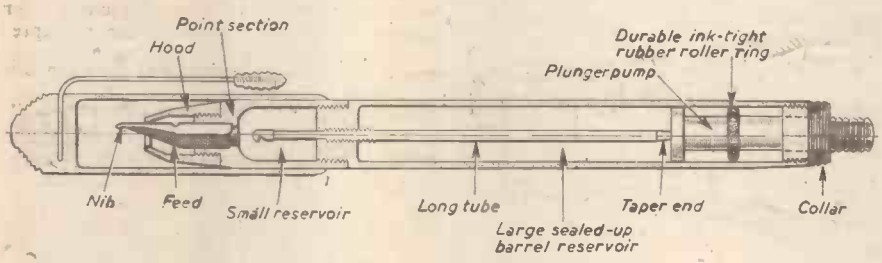

*Fig. 6.—Showing the principle of the pitot tube, whereby the velocity of a flowing liquid may be measured.*

*(To be continued)*

# Fountain Pen Competition Results

THE competition set in our November, 1948, issue for an improved fountain pen attracted a large number of ingenious devices, most of which were improvements on existing fountain pens. It will be remembered that certain restrictions were laid down. The pen should be leakproof, have full-barrel capacity for ink, it must be easy to manufacture, reasonable in size, and pleasing in appearance.

The design submitted by Mr. H. B. Munro




*Mr. H. B. Munro's design.*

led the field. His pen is an improvement upon the original Research pen marketed by his father some years ago. The improvement in the present pen is mainly concerned with the fitting of the now popular hooded nib.

The purpose of Mr. Munro's design is to eliminate air expansion, which is a particular cause of flooding and blotting in all large-capacity pens. It will be seen from the diagram that the sealing up is effected by having a large-barrel reservoir, and using only a comparatively small point section reservoir. In other words, the large reservoir is the reserve ink bottle, and the small reservoir is filled from it whenever required.

The construction of the pen is designed to make the whole pen cleanable (essential for all transparent pens). The point section unscrews, and is a simple matter to clean at any time. The barrel is cleanable by unscrewing and removing the collar and pulling out plunger and rubber ring.

The pen features a special design in type of hood, which also unscrews for cleaning. It reduces to a minimum evaporation, and consequent drying up of nib and feed. It eliminates the need for any inner cap in the cap of the pen. It also prevents any tendency of flooding or blotting by holding safely any overflow ink from any cause, The small nib and the internal design of hood, in relation to diameter, etc., of feed, ensures no surplus ink remaining in the hood when the pen is in use.

The mechanics of the pen provide a freely moving piston plunger which "rolls on the rubber ring," and is completely inktight, and completely durable—there is no mechanical wear. The plunger also, when pushed in moderately hard, adheres on to the tapered end of the long tube, and seals up securely the large barrel reservoir; also the plunger itself is thus held in securely for carrying in the pocket, etc. The plunger can be released at any time when required by giving the knob a moderately strong "pull out."

The pen is filled by dipping nose in ink and operating plunger until pen is full. The plunger is then finally pushed in to adhere in and seal up the large reservoir.

To transfer ink from the large reservoir to the point section reservoir, when in the course of writing the point section reservoir becomes empty of ink, it is refilled by the following simple procedure: Hold the pen point upwards and pull the knob out fairly quickly, and as far as it will come. Then, while still holding pen point upwards, push the knob in again fairly slowly. The large reservoir is then sealed up with the final push in of the knob. It is interesting to note that the pulling out of the plunger quickly (while pen is point upwards) counteracts effectively any expansion being held in the large sealed-up reservoir at the moment of releasing the valve. I have tested one of these pens and find that all Mr. Munro's claims are justified; he therefore takes the first prize.

**PRIZE WINNERS**

£10-10-0 H. B. Munro, 828, College Road, Erdington, Birmingham, 22c.
£5-5-0 E. Molyneux, 66, Hollingbourne Road, Herne Hill, London, S.E.24.
£3-3-0 A. D. Cameron, c/o Barclay, 59, Union Grove, Aberdeen.
£2-2-0 E. Cassidy, 1, Alexandra Road, Formby, Lancs.

Only one prize of 10 gns. was offered, but in view of the excellence of the entries, the prize money has been augmented as shown in the centre of this page. The second prize-winning pen consists of eight main parts:

The cap—not shown; the barrel, of plastic material, grooved and channelled as shewn:

The reservoir, of metal, a close fit into the barrel, having on the inside, for the whole of its length, a projection about ⅛in. x 1/16in.; at a point near its base; a button to slide in the groove and channels of the barrel; and threaded at the top to take the ink guide, which differs from the normal in that the ink flows through a capillary tube through the *centre* of the guide.

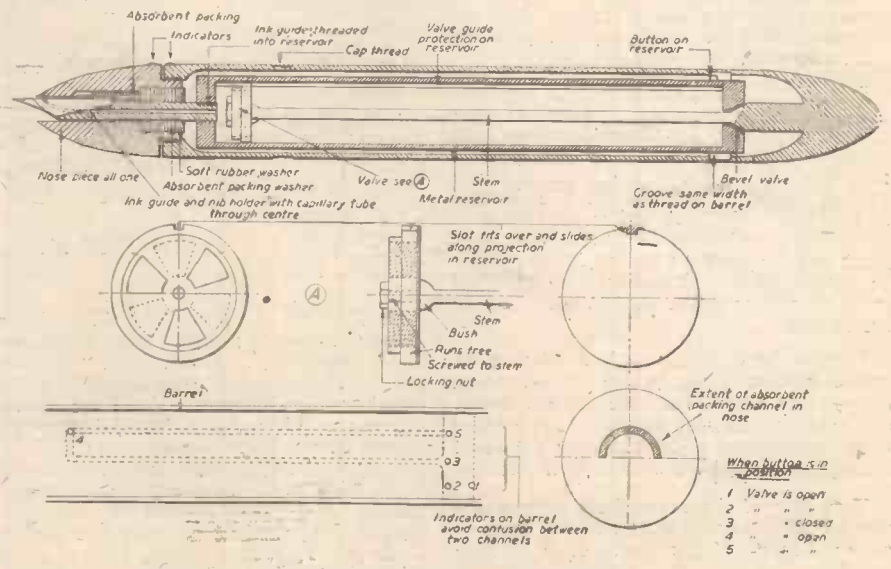
The nose is made in one piece, with a hood to protect the nib from dirt and dust; a semi-circular channel commencing just below the opening of the capillary tube in the ink guide and running parallel to it; and allowing sufficient pressure between its internal diameter and the ink guide to retain the nib, of the normal type.

The valve gear consists of two circular metal plates, each bearing three holes, each hole being slightly less in width and radius than ⅛th segment of the smaller circle. The larger plate is free on the stem but engages with the projection of the reservoir. The smaller plate (smaller to clear the projection) is threaded and locked on to the stem. The stem should preferably be solid to avoid buckling where it passes through the bevel gear, which is lined with an ink-resisting material.

When the pen is in use the valve is open; ink flows from reservoir to nib.

To fill, unscrew barrel (button moves from 1 to 2) (valve opens and closes several times, but this is immaterial.) Turn barrel until two indicator marks on barrel and nose coincide (this is arranged so that button is now at 3—valve closed). Immerse ⅛in. of nose in ink and slide barrel upwards (stem and valve gear move upwards, button proceeds down first channel to bottom, valve being closed, ink is drawn into reservoir, air being expelled through bevel valve). Turn barrel (button at 4—valve open). Slowly return barrel (button proceeds up second channel). (Ink passes through valve and is not forced out through nib owing to the small size of the capillary tube compared with the large holes in the valve.) Screw up barrel. When barrel is on tight, valve is open and bevel valve is closed tight.

A little slackness between the two metal




*The second prize-winning design, by Mr. E. Molyneux.*

plates of the valve is advantageous, allowing faster flowing of ink when necessary, but not interfering with the valve when closed. It has the following advantages:—

Hooded nib; syphoned ink retained by packing material; central capillary tube—ink cannot seep through intermediate joints; ink guide threaded into reservoir—no seepage; Metal reservoir—non-breakable, non-perishable; at least double ink capacity; not too complicated to manufacture; absorbent packing and packing washer can be renewed easily—say, once every six months; soft rubber washer could be made of greater thickness, to make contact with top of reservoir—to reduce possible damage by shock.

The third prize entry, submitted by Mr. A. D. Cameron, has a nib formed from metal tube cut away to provide a writing point. The centre piece is a plastic material having three fine saw cuts communicating with the central hole. Y is a wider slot at the end of the hole, and Z forms a capillary passage for the ink. The nib holder is also plastic material, the tube is transparent, as also is the air pipe. The operation is as follows: For filling, the pen is held upright with nib submerged and rubber bulb repeatedly compressed between finger and thumb. Air is ejected via centre tube, entering slots X and preventing ink being pushed along capillary passage Z by creating an air lock. The air is replaced by ink until barrel is filled to the level of ferrule. Ink can be observed through translucent barrel. When writing, ink reaches the nib via passage Z and is replaced in barrel by air which enters at Y and passes up the air tube. When carried in the pocket, the nib is uppermost, and any ink in passage Z or slots X is pushed up by expanding air in the barrel and enters Y and drains back down the air tube, thus preventing ink being forced out into nib cover.

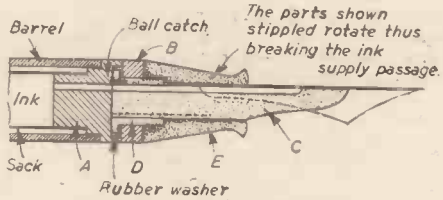
Laid on side, the ink lies in air-tube and barrel. When pen is taken up to write ink stands in tube above slot Y, but cannot flow out as there is no air inlet. When writing is commenced ink is drawn from the section of tube between slots X and slot Y, air entering at X. This breaks the column of ink in centre tube, and when the supply below the break is exhausted the pen functions in normal manner, the air entering at Y pushing remains of ink column back into main barrel.

Mr. Cassidy's pen consists of a normal type of barrel, sack, and filling arrangements (either level or press button), but it has a rotary nib holder, which breaks the ink supply channel, preventing any leakage when not being used.

Parts D and E are screwed tightly together, and are virtually one piece. They carry both the nib and part C. These parts are held tightly against the face of A (which is finely machined) by means of the collar B and a rubber washer. The small die hole through A is slightly off centre and is colinear with the channel in C when the pen is being used. After use the head is given a quarter turn or so, cutting off the ink supply. A small ball catch or similar device ensures the channels are in line.

It must be distinctly understood that all manufacturing rights in the prize-winning designs are reserved by the prize winners, and manufacturers are not entitled to proceed with manufacture without making the usual arrangements with the owners of the design.

Very few of the competitors gave attention to the important matter of ink flow, or rather the rate of ink flow. It is of little use increasing the barrel capacity if the nib uses up ink at a more rapid rate than an ordinary pen. No two nibs are exactly alike, nor are any two nibs of exactly the same thickness. Moreover, no two persons write with the same pressure on the nib. All these points affect ink consumption. A ball point gold nib for example being as thick as it is wide at the writing point would use more ink than an ordinary nib. A fine nib will use less ink than a broad one. The tube feed of Mr. Munro's design always gives the same supply of ink to any nib. It brings the ink reservoir itself right down to the point of the nib, and the ink will not shake out readily because of the short length of the point section reservoir employed. The feed is made ink tight at its inner end by means of a weakened edge pushing it up into a slight taper. The feed cannot flood because it chokes itself at the air hole automatically. The aim obviously is to produce a feed that



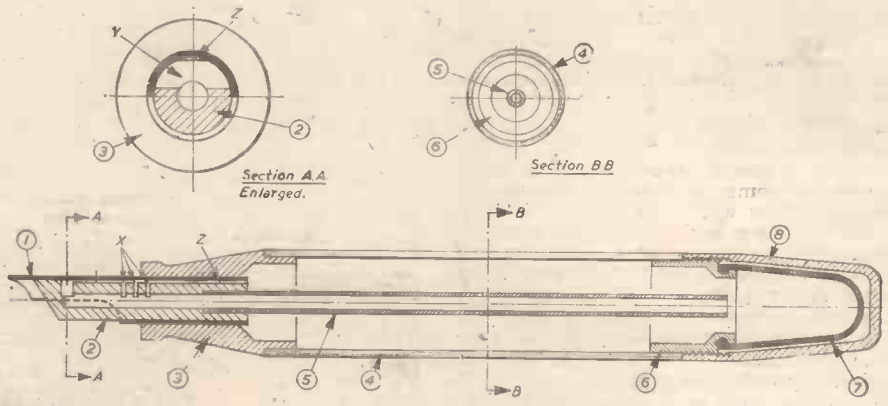

*Part section of the pen designed by E. Cassidy.*

always writes like a freshly dipped nib, without periods of ink starvation.

Most pen manufacturers, of course, have qualified pen experts at their service depots to adjust pens to individual requirements.

We shall publish a further selection of entries sent in by consolation prize winners next month. We hope that pen manufacturers will study the designs, and if they think well of any of them will make arrangements for manufacture with the senders.

Consolation prizes have been awarded to the following:—




*Sectional details of the pen designed by A. D. Cameron.*

D. H. Reed, 1, West Fold, Old Malton, Malton, Yorkshire; G. F. Payne, 98, Hinton Road, Hereford; E. R. W. May, "Brackenside," The Circle, Moordown, Bournemouth; K. Greatorex, 34, King Street, Ulverston, Lancashire; W. J. Burns, 3, Milton Street, Barrow-in-Furness; S. Pattison, 57, Hyde Place, Aylesham, Nr. Canterbury, Kent; C. Johnson, 30, Acresfield Avenue, Audenshaw, Manchester; Col. J. F. Metcalfe, Ivy Bank, Milford-on-Sea, Hants; P. Smith, 1, Ekowe Street, New Basford, Nottingham; E. F. S. Crowe, 25, Morritt Drive, Halton, Leeds; R. Barker, 69, Hunloke Ave., Boythorpe, Chesterfield, Derbys; E. Evans, 8, Wobaston Road, Fordhouses, Wolverhampton; J. P. Elliott, 47, Chesterfield Road, Staveley, Chesterfield; R. B. Taylor, Heathways, Church Hill, Charing Heath, Nr. Ashford, Kent; M. Hardy, 17, New Road, Fatfield, Co. Durham; H. L. Morel, 24, Windsor Avenue, North Cheam, Surrey; A. Young, Market Chambers, Beaufort Street, Brynmawr, Brecs.; J. J. Milgrew, 55, Arran Drive, Auchinleck, Ayrshire; L. Herbert, 48a, Cavendish Road, Brondesbury, London, N.W 6.; J. Sayerr, 45, Chapel Hill, Woolwich; C. W. Lee, 3, Church Street, Leighton Buzzard, Beds.; W. E. Pullan, 62, Victoria Gardens, Horsforth, Leeds; S. Stewart, "Clonard," Taylor's Hill, Galway, Eire; H. R. J. Norman, 39, Hartington Street, Belfast; D. F. Stroud, 2, North Close, Danson Road, Bexleyheath, Kent; W. A. Mills, 38, Bonython Road, Newquay, Cornwall; A. Brown, Craigview, Neilston, Glasgow; A. Cooke, 20, Moordell Close, Yate, Bristol; A. M. El Shayeb, 24, Abdin Square, Cairo, Egypt; E. H. Baker, 109, Cheapside, Worksop, Notts; P. Johnson, 23, Glenmore Street, Southchurch, Southend-on-Sea, Essex; W. Collister Jones, 18, Ffrydlas Road, Bethseda, Nr. Bangor, North Wales; E. Jhergh, 10, Hodgson Avenue, Moortown, Leeds; J. Tomlinson, 18, Crookston Drive, Glasgow, S.W.2; R. F. Coward, Spurriers Cottage, Pontefract Road, Knottingley, Yorkshire; H. C. Flind, 3, Eltham Park Gardens, Eltham, S.E.9; J. S. Asborne, 53, Mayland Drive, Royal Park, Sidcup, Kent; F. Booth, 1, Balmoral Street, Droylsden, Lancashire; E. Mockin, 18, Egypt Street, Liverpool 7; D. J. Napier, 86, Lordship Lane, Tottenham, N.17; J. R. Macaulay, "The Nook," Ridge Road, Rotherham; D. O. Walker, 20, Cornhill Terrace, Aberdeen; Dr. E. Jacob, 84, Harley Street, W.1; A. Chinn, 10, Great George Square, Liverpool, 1; W. R. Cumming, "Rosemount," 35a, Crown Drive, Inverness; L. A. J. Clapman, 3, Beatrice Road, Southsea, Hants; E. T. Bailey, 62, Marshall Avenue, Bognor Regis, Sussex; N. Martin, 70, Borrowdale Avenue, Walker, Newcastle-on-Tyne, 6; D. Browning, 70, Ridge Park Avenue, Murley, Plymouth; R. C. Upson, 53, Cromer Road, Norwich; A. H. Payne, 63, George Frederick Road, Sutton Coldfield, Nr. Birmingham; G. Hand, 75, Kingsland Avenue, Northampton; A. J. Robinson, Cree North Ward, Crichton Hall, Crichton Royal, Dumfries, Scotland; C. Hearne, Parkside, Lower Road, Chalfont St. Peter, Bucks; E. W. Kreye, Pear Tree Cottage, Shurdington, Nr. Cheltenham, Glos; D. R. Thorne, 15, Garden Crescent, Garden Village, Gorseinon, Swansea; A. W. Else-Good, 15, Hawkdene, North Chingford, E.4.

# Early Days of Model Flying

## The Activities of One of the Pioneers of This Popular Pastime

By E. W. TWINING

IT was at this time, just 40 years ago, that I had produced three models of aeroplanes, each differing from the others, which really did fly. All of them were biplanes, and all had leading monoplane elevators and single propellers, rubber driven.

With the exception of a special model made a year or so previously by Mr. A. V. Roe, and some small, heavy, fast wooden monoplanes by Mr. T. W. K. Clarke, these little biplanes of mine were, so far as my knowledge goes, the first to make successful distance flights.

### Forty Years Ago

The practical experiments, which led up to the production of these, began early in the year 1908, although many years before that I-made air screws, some as large as 30ins. in diameter, and a plane shaped somewhat like the old-fashioned kite. I was in my teens then.

By 1908 I had come to realise that the supporting planes of the machine must—as Santos Dumont and the Wright Brothers had demonstrated—be narrow fore and aft and of great width across; in other words, their efficiency must depend upon a high aspect ratio.

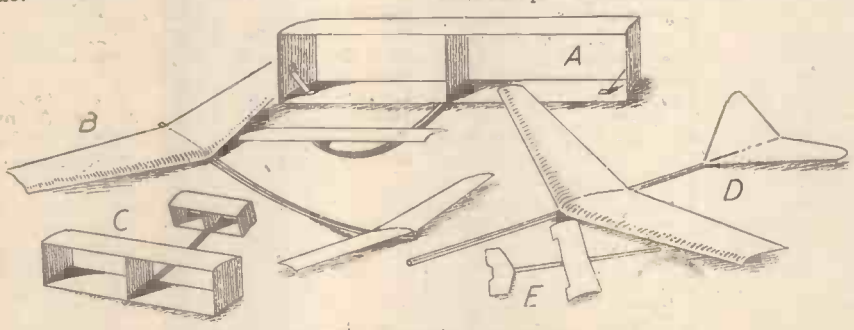



*Fig. 1.—Experimental gliders of the year 1908.*

The experiments began with the making of gliders, some tiny, and a few somewhat large. They were made mostly of paper with a wooden longeron between the main wing and the fore or aft wing as the case may be; for some had a main wing with a no-angle tailplane and others with the main wing at the rear and a small leading plane making a positive angle with the main.

In those days there was no balsa wood and the lightest wood then available was bass. Of this wood a few of the gliders—the larger ones—were made as regards the wings. Some of the main planes were planed down on the bench from 1/16in. thick bass wood to the correct section and were therefore solid; whilst others were built up of spars and ribs and covered with Jap silk. In Fig. 1 is shown a few of the many sizes and types.

Of these gliders I found that in every case those with the leading loaded elevator, A B and C in Fig. 1, made the best and finest gliding angle, and so it was on this type that I based the design of the later flying models. The longitudinal stability was far better because with a given length of longeron the tailed model had to have the main wing near the middle of the spar, in the same way as does the modern model have the wing near the centre of the fuselage. There was too little space between the wing and the tail for good stability (see D and E, Fig. 1). With the other type the elevator was at the front end of the longeron and the main plane at the rear.

The early machines (full size) of both Santos Dumont and Wilbur Wright had no tails but leading elevators, though the Wrights' first machines had no incidence angle on the elevator, and they were consequently not automatically stable longitudinally. On one occasion Orville Wright nearly lost his life owing to pressure being momentarily taken by the top surfaces of the biplane elevator. The machine crashed, of course. The remedy for the condition was to move the centre of gravity forward, which compelled the elevator to be placed at a positive angle to that of the main wings.

When I had arrived at what I, in the autumn of 1908, considered finality as regards type, I converted one of the gliders, a fairly substantially built one, into a flying model by providing a front hook and a rear spindle bearing with a propeller and a skein of rubber. As an aeroplane it flew very well, the distances covered varying between 46ft. and 172ft. Of this latter, 42ft. was a glide made after the power was exhausted.

### Model Biplanes

After this, two other biplanes were made and the three became known as Nos. 1, 2 and 3. By that time I thought it worth while to give other people opportunities of copying these models, so sheets of drawings were prepared, and the late Mr. Percival Marshall, of *The Model Engineer*, published them, with a booklet in an envelope with the portrait of myself, which is reproduced in Fig 2, on the cover. The date when this photograph was taken was February 16th, 1909, so publication of the drawings took place shortly after that.

*Fig. 2.—The author with No. 3 model. February 1909.*

The envelopes had a marvellous reception from the public, some 30,000 copies being sold in the first issue, and I believe the three editions ran to about 60,000 copies. Shortly before the last war a gentleman whom I had never previously heard of, sent me one of the envelopes from Australia. Yet another man, Mr. W. H. Dawe, of Sheffield, not long after publication, sent me a photograph of the No. 3 model which he had made. This photo I have kept by me, all through the years, and now reproduce it as Fig. 3.

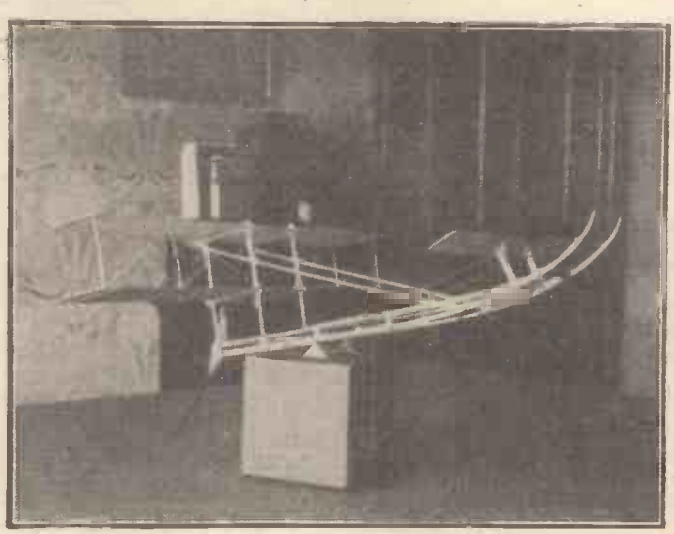


*Fig. 3.—Aeroplane model No. 3.*

As soon as these sheets of drawings were issued the public began to inquire for the materials wherewith to build them, so I began to turn out parcels, one for each of the three models from my premises at 29b, Grosvenor Road, Hanwell, Middlesex. It may be that some of my old friends will remember this address.

There was a small—a very small—demand for finished models, but most people wanted "naturally" to make their own so, whilst the

workshop staff were turning out the parcels, my partner, Mr. Cuthbert B. Davies, who joined me at this time, and myself were able to concentrate on new and improved designs. We got away from orthodox types, abandoned the biplane and devoted our efforts to producing a far more powerful and, for its wing area a much lighter machine.

**Unorthodox Design**

By early 1910 we had arrived at something which in no way resembled an orthodox aeroplane. It had a length of frame of nearly 5ft., such frame being of V-form in plan, a very narrow vee. The elevator was of steel wire covered with doped silk and with a simple friction angle adjustment. The main wing was a frame of birchwood, the ribs being suitably cambered.

I should have mentioned that the spars of the frame were channels of spruce, having a thickness of 1/16in. only for both web and flanges. They varied in depth from about 1in. at their centres to about ⅜in. at the ends. There were two 4ft. 8in. skeins of rubber each driving a 13in. propeller. The right propeller was of right-hand pitch and the left of left-hand pitch, so that when the rubbers were wound and the machine raised for launching the working faces of the two screws pressed against the palm of the hand.

In August, the exact date I do not remember, of 1910 a competition was inaugurated by the Kite and Model Aeroplane Association, of which Mr. W. H. Akehurst was secretary, for a longest distance flight, the winner to be awarded a silver medal and challenge cup put up by Messrs. A. W. Gamage, Ltd., and afterwards known as "The Gamage Cup." Each competitor was allowed three flights.

Four of us from Grosvenor Road entered, all with almost similar machines. The ground was not very well chosen and in my first flight my machine was damaged by striking a post. However, by the time my turn came around again I had effected a repair and although my colleagues did very well, especially Mr. Davies, mine was the longest flight of the day. Should any reader of this be sufficiently interested to do so he can look up a goodly number of pictures of the competing machines by going to the Patents Office or other public library and asking for *The Aero* of 1910. He will find what he wants in the issue for August 24th, pages 136 and 137. Fig. 4 is a reproduction of one of the illustrations. There he will see a picture of Mr. Bragg-Smith launching his beautiful biplane; a machine for which I had a great admiration and about the most automatically stable model I have ever known. It could be launched sideways or upside down, it made little difference; it just righted itself and flew on.

Then in another picture he will see Mr. Fairey, later of Fairey Aviation fame, also Mr. Rowland-Ding, who became a pilot and was killed in the 1914-18 war. It is impossible to look at the machines in the majority of these pictures without feelings of admiration for the delicacy of the designs and construction shown. And they were all good fliers too; many, or most of them, far above the present-day average.

To return to my own doings: the next thing we had to do was to supply the demand for parts for building the Gamage Cup winner, but here the call was not so very great Other people began to enter the field and in a few cases their goods were equal to ours.

**Man-carrying Gliders**

I might mention that at this time, 1910 and 1911, we were building full-size man-carrying gliders, as well as one- or two-engined machines, but these are outside the scope of these articles. But what perhaps is within the scope is the fact that we were making and selling drawings with sets of materials for constructing both flying and scale models of the well-known full-size aeroplanes: that of the Wright Brothers, of Henri Farman, of Bleriot and the Antoinette, names which along with that of Cody, Maurice Farman and others are nearly, if not quite, forgotten by the present generation.

The next competition which was organised was for duration of flight, the prize being another silver challenge cup offered by *The Model Engineer*. For this I made a specially light machine with fairly big wing areas and a particularly nice pair of right and left hand propellers.

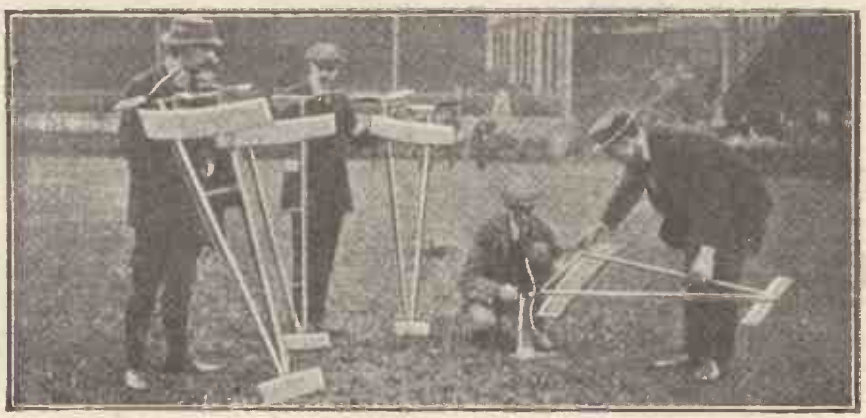


*Fig. 4.—A team of Twining machines at the Crystal Palace, 1910.*

Fig. 5 is a portrait not only of this machine but, unavoidably so, of myself. It will be seen perhaps that the number on the machine is "13." This number was *given* to me in the Gamage Cup contest and for *The Model Engineer* competition I *asked* for it. The photo was taken the day after the second cup was won. The competition was again at the Crystal Palace and on June 14th, 1911. My duration was 46 seconds.

**Winding the Rubber "Motor"**

This machine was the first to be fitted with a simple arrangement for winding both skeins of rubber at one and the same time, the geared double winder being invented by my partner and was made from a converted egg-whisk. The winder was attached at the front, or elevator, end of the machine. I forget the ratio of the gearing, but I believe it required about a hundred turns of the handle to put 500 turns in each of the rubber motors.

The two propellers were each 8in. in diameter with a pitch of 20in.; they were carved from solid blocks of either silver spruce or yellow pine, I forget which, and french polished. The main centre spar or longeron was not solid but was pierced with slots vertically, each slot being about ⅜in. wide by 1in. long; this throughout its length—or nearly so. The wood was bass and after glass papering it was wrapped with Jap silk, glued on and shellac varnished. It was, as will be seen from Fig. 5, stiffened and braced with outriggers of birchwood and the finest silvered-steel music wire. To the best of my recollection the spar measured in cross section, at the centre, about 9/16in. by 5/16in.

This machine was never flown before it was launched in the competition, so sure were we, by that time, of what could be done in design.

**The "Wakefield Cup"**

Only 21 days after *The Model Engineer* competition, namely on July 5th, 1911, there came another competition at the Palace. Again a challenge cup, but this time a large and magnificent object in silver gilt. It looked as though it were made of solid gold! It became known as the "Wakefield Cup" and was put up by Sir Charles Wakefield, afterwards Lord Wakefield.

Like *The Model Engineer* show, the competition was for duration of flight, but with a very important difference: the machines were not to be launched by hand but must

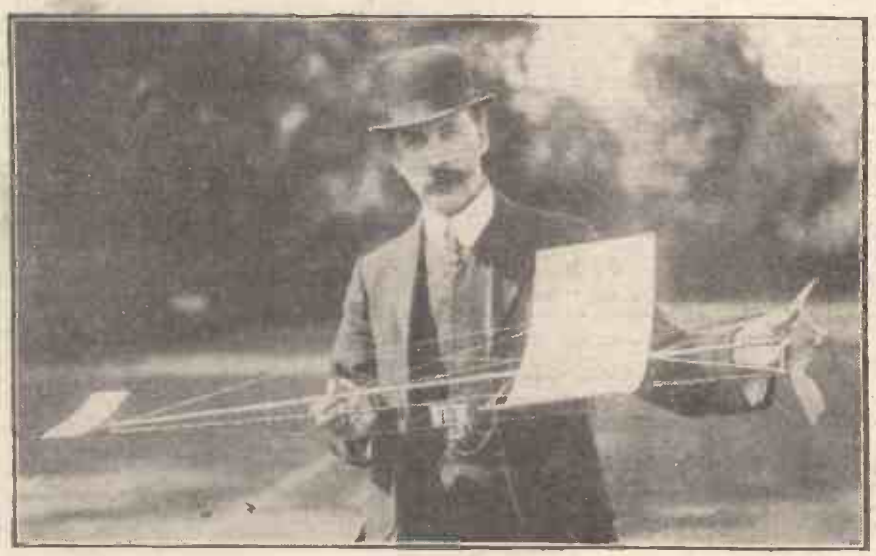


*Fig. 5.—The author with the machine which won the "Model Engineer" and "Wakefield" Cups.*

rise from the ground under their own power and points were awarded for shortness of run before take off, for stability and for time in flight from the split second after take off.

I decided to use the same machine as had won the "M.E." cup, and added an extremely light undercarriage with wheels made from Bristol board. Again no trial flight was made, but I had one less strand on each rubber skein. This brought the weight to slightly less than it was before the undercarriage was fitted and enabled me to get 600 turns on the rubbers. The competition was most excellently organised by Mr. Akehurst and the committee; they carried to the Palace a length of linoleum to use as a runway. A splendid idea I thought.

Again I was given Number 13 but I do not remember how many machines were entered. A very few failed to take off, but at least two got off the lino in shorter runs than did my machine and I think mine was a few inches under three feet.

My duration, actual flying from take-off, was 63 seconds, but would have been much longer had the machine not flown into a tree, long before the rubbers were unwound.

It was rescued but somewhat damaged. Whether my duration was the longest I do not know but anyway I won the cup on points and Sir Charles Wakefield presented it.

### The Three Challenge Cups

So I had in my house at Hanwell, not far from the workshops in Grosvenor Road, all three of the cups and there I photographed them (Fig. 6). By a fortunate chance I have kept a print and the other prints, which are reproduced here, as well, little thinking that my old friend, our Editor, would ever want them brought to light in these reminiscences of days and doings long past.

Just what happened to the original Wakefield Cup I do not know. I did not compete again for this or any other cup, but served on the council of the Kite and Model Aeroplane Association. The "Wakefield" was won by another member in 1912 and, I believe, in either 1913 or 1914, it went to a Dutch or Belgian competitor; after which—early in the first world war—Lord Wakefield called the cup in and, I understand, after the war, gave a new cup.

I omitted to say when referring to Fig. 6 that the cup on the left is the "Gamage," that on the right the "M.E." and the one in the centre the "Wakefield."

I said above that I did not enter any further competitions, but Cuthbert Davies, my partner, did and won outright a beautiful silver rose bowl which I still have. He was killed in France in September, 1914. The machine which he flew was an all-duralumin one, no wood being used except for the propellers which I believe were those from the "M.E." and "Wakefield" machines. The competition was for altitude, which called for powerful motors and high rate of climb.

### A Comparison

And now I would like to say a few words about the machines of those days as compared with the flying models of the present day. The reader will notice I use the terms: "machines" and "flying models."

In the years to which I have been referring, although we had called them "model aeroplanes" they were not "models," but I do very much resent the expression adopted by later aero-modellists, namely, "flying sticks." They were far more than mere sticks, they were highly scientific little machines, some of which flew as well and were much more automatically stable than the majority of the miniature aircraft of the present day. How many models of orthodox type with their great propellers in front and long-legged undercarriages will make a dignified three point landing? Not many; yet in the old days one never saw them tumble heels-over-head as they do now. Why must the modern model always have a tail, a main wing in the middle of the fuselage and the "prop" in front? By all means use the fuselage with the rubber inside of it, but put the main wing—built of balsa as at present—at the back. Instead of a tail (which carries no weight) put a leading smaller plane pitched at a positive angle with the main and a really well designed and well finished propeller at the back.

*Fig. 6.—The three Challenge Cups.*

### Centre of Gravity

The centre of gravity of the whole model must be well in front of the main wing, the exact distance being in inverse ratio to the areas of the two supporting surfaces. The result would be a machine which would have such perfect longitudinal stability that it would never stall, never make a disgusting landing, never break its propeller and prove a better flier with far fewer needs for repairs or writing off. So far as I am aware a model designed on these lines, or a machine of this type, would not constitute an infraction of the rules of the Society of Model Aeronautical Engineers.

### Loaded Elevator Type

I remember that in the early period of the late war I was in conversation with Mr. Frise, of Frise aireleon fame, and he said he was a great believer in the loaded elevator type of aircraft. Really, however, in full-size practice, there are difficulties in the way; notably in the placing of the engine, but many such machines *have* been built, and could be again, but the only chance of success lies in the use of two engines forward of the leading edge of the main wing, one to port and one to starboard.

*This fine group of model galleons was on view at the Model Engineer Exhibition held last year at the Royal Horticultural Hall, London.*

# Letters from Readers

### Long-handled Screwdriver

SIR,—The very good suggestion of Prof. A. M. Low could only be applied in those cases where there was no tendency of the blade to slip out of the slot—a usual symptom with stubborn screws necessitating a long-handled screwdriver.

The principal advantage of such a driver is due to the fact that its length enables better *personal* leverage to be obtained; the working position in various stances is not cramped as with a short one. It can be operated usually from the shoulder in the most powerful anatomical attitude with the muscles flexed, and both hands often used to grip the proportionally large handle fitted to balance the long shank.

The longer the shank the greater its intrinsic spring, which under tension of use is abruptly released as useful torsion, thus giving the helpful effect of a momentary liberation of accumulated power which increases with the tightness of the screw.

The greater weight of the long screwdriver keeps it in position better in the screw slot due to its own inertia, thus allowing more attention and energy to the twisting action than is psychologically applicable with a short one.—WILLIAM E. THOM (Dublin).

SIR,—Regarding the screwdriver theory of Prof. A. M. Low (January, 1949), I cannot agree that a long handle helps leverage. In event of the screwdriver being tilted, no extra leverage is obtained unless the screwdriver blade and the screw are rigidly connected, otherwise the blade of the screwdriver and the slot of the screw merely act as a universal coupling to transmit the same leverage as is provided by the diameter of the handle.—G. T. SMITH (Goole).

### Coal-fired Model Boilers

SIR,—I have often noted the limitations imposed on the design of realistic models of steam engines, both marine and locomotive, by the fact that coal as a fuel will not burn in very small fireboxes, owing, I understand, to the draught created not being proportional in force to that in a full-sized firebox. Hence provision has to be made for blow-lamps or vaporisers, etc., which bear no resmblance to the real thing.

The other day when reading Professor Jamieson's "Text Book on Steam and Steam Engines," in the chapter on caloriometers, I came across what I am sure would be a solution to this problem, and a solution so obvious that I wonder it has not been applied before. That is, give to scale-sized coal in a scale-sized firebox the oxygen it cannot draw from the air in the form of chemicals in just the right quantity to promote satisfactory combustion. Too much chemicals and a too finely divided coal would result in a combustion so fast and perfect as to become an explosion, but I feel sure that experiment with graded coal and a suitable amount of "oxygen mixture" could produce an effective fire in any size of firebox.

Here are items from the book quoted which might be of interest to anyone wishing to try out the idea:

"Coal burned in pure oxygen evolves the same amount of heat as when perfectly burned in air."

"For testing the heating properties of various samples of coal in Mr. Lewis Thompson's caloriometer, or fuel tester: This completely burns the sample in an inverted container under water (no air at all) by mixing with the finely divided sample of coal 8 to 13 times its weight of oxygen-mixture, which is = 3 parts by weight of chlorate of potassium and 1 part by weight of nitrate of potassium."—H. GOULDEN (Gateshead).

### Fog

SIR,—I was very interested and pleased to note that the leading article in January PRACTICAL MECHANICS, was about fog and its serious effect on travel.

As a motorist who travels many miles a month in all weathers visiting patients, I am naturally interested in some means being found to help the movement of all forms of traffic on the roads in foggy spells.

I am not mechanic enough to suggest any means of fog dispersal, but I do feel that road signs could be improved which would help considerably.

My suggestion would be to vary the "cats' eyes" according to the road. For instance, if one takes Birmingham as a centre the road from Birmingham to Stratford-on-Avon could be a blue one and a white one. From Birmingham to Warwick could be a green one and a white one. From Birmingham to Coventry could be a green one and a blue one. From Birmingham to Bristol one amber and one green. From Birmingham to Lichfield one blue and one amber. The combination could be varied a hundred times and the regular drivers would know they were on the right road by the code of "cats' eyes." Strangers could be warned by a sign (in "cats' eyes") of the type of reflectors they should follow to get to a certain destination. After the initial outlay the upkeep would be no more than at present.

All warning signs and Belisha crossings should be in red, and if possible some sort of soft light thrown on to the crossing to reflect.

I have found the ordinary white "cats' eyes" a great help in foggy weather, and I think their use can be better utilised.—S. A. STARKEY (Leamington Spa.)

SIR,—Your invitation of suggestions for overcoming fog handicaps can manifestly only properly be accepted by those with some scientific standing in this field.

Prescribing remedies is not therefore for the layman, but perhaps the following questionnaire may at least serve to focus the problem:

(a) If fog is merely a cloud at ground level is it not amenable to treatment by the various artificial rain-making methods which have been tried with varying success? If not, is it because a really successful technique has not yet been evolved?

(b) If infra-red rays can penetrate fog, surely by now some relatively simple means exist of rendering them visible to the eye by shortening their wavelength? Over fifty years ago it was known that the passage of rays from the red end of the spectrum through a solution of magdala red shortened them to visible yellow, and it is some years now since a report appeared of an instrument in which infra-red rays excited electron emission from a screen, a focused image being created on a fluorescent screen.

(c) Obviously every vehicle and pedestrian cannot be equipped with radar, but if infra-red photographic plates are readily available why not infra-red binoculars? Is it lack of interest, or of research, or are the authorities afraid of the social consequences of Dick, Tom and Harry being able to see in the dark?

(d) If all the visible rays of the spectrum are scattered and annihilated by fog can greater attention to street lighting prove of much avail?

Finally, sir, may I say that I firmly believe that this problem, *like many others*, could be speedily solved if Governmental technical advisors as a class could be prevailed on to exchange their present contemptuousness in regard to outside ideas and suggestions for a fealisation that there are in the world intelligences other than their own.—J. A. JOHNSON (Penzance).

SIR,—With reference to your editorial article on the danger of fog. I feel that it would be very difficult to produce a system of car lighting that would penetrate fog satisfactorily unless one could fit infra-red apparatus on vehicles which would be extremely costly and difficult.

I suggest that the only way to overcome this menace is to set up fog washing establishments. I know this sounds fantastic, but this is what I propose. Fog is a collection of smoke and dirt, and consists mainly of the output of London's chimneys. Now, at notorious bad spots for fog around and in the London area, set up a plant to intake so many cubic feet of air (fog), wash it, extract the by-products, separate the smoke and air (if this is possible).

Throw out the clean air into the neighbourhood, and if one cannot entirely separate the smoke from the air throw this out through 60 or 100ft. chimneys much as they do at Battersea Power Station. The annual value of the by-products would, I imagine, pay for the scheme in a few years.—F. A. KEMP (Finchley).

SIR,—As a reader of PRACTICAL MECHANICS I would like to give my suggestion for helping transport and the railways in fog. My suggestion for the railways would be to have two parallel lines of neon light fifty feet long. This neon apparatus would be fitted up permanently at the side of the track, a short distance before the usual signals. The driver would see at a glance whether it is showing a green or red strip. This would save time and let the train carry on its course without fear of making any mistakes in the fog. Both the neon strip signal and the usual signal can be worked as one, for green or red, by the signalman, the same as he is doing with the present signals.

My other suggestion for road transport would be to lay a narrow iron line flush with the road, one for the up traffic and one for the down traffic, with branch lines to all roads that matter. The apparatus on the vehicle would be fitted on the dash in front of the driver. This apparatus would be a form of wireless apparatus on the lines of a mine detector, so that if the vehicle was going away about a yard off to the side of the iron line an indicator would register to the driver he was off course. In the event of crossings there would be short neon strips or some kind of coloured light, such as blue for London, yellow for Carlisle, and so on. Different routes would have a different colour, and this would let the driver know if he was on the right road, and save the driver time and suspense wondering if he should risk carrying on.—W. G. BATES (Dalkeith).

# Cars Must Change

## Some Ideas and Possibilities of Development

By Prof. A. M. LOW

SOME things are certain. You will remember the story of the lazy boy and the steam engine. He had to open the inlet valve by pulling a string every time the piston reached dead centre and he soon fixed up a lever to do his work. So it was with the old automatic inlet valve which was always fitted to automobile engines not so long ago. Mechanical valves had to come. It was obvious.

But design is just as crude to-day in the eyes of the future and it is clear that certain characteristics, common to nearly every car, have to go. It is still obvious, and the details, as the catalogues say, are "too numerous to mention." They are a matter, not of prophecy, but of common sense.

Exactly the same circumstances apply to general invention which is as much an affair of fashion as a hat. In the early days of the cinema most people preferred a magic lantern. Then movement became necessary. Then sound, colour, and now we search wildly for stereoscopy with all its nearly impossible technique. Every one of these changes was accurately foreseen and violently derided at the time.

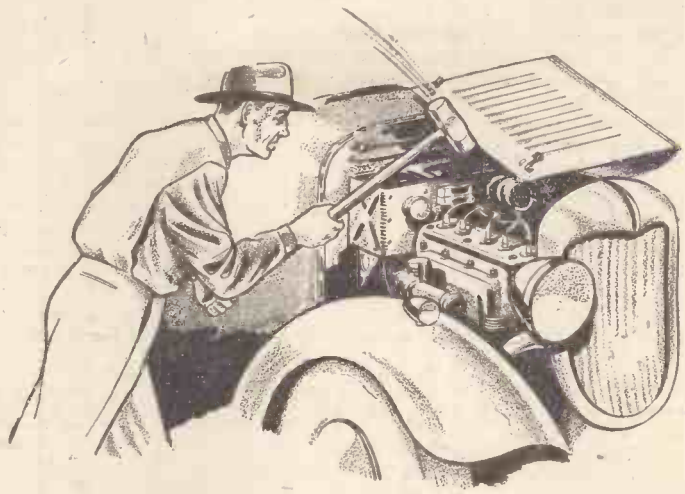
Motor-cars are the best example of all because they are collected from nearly every branch of science, from biology in tyres to mechanics, metallurgy, chemistry and modern physics. A conglomeration which remains both incomplete and startlingly poor if we think upon first principles.

Take carburettors and mix them with the otto-cycle. We want petrol-gas and air, but dare not use them because partly vaporised liquid helps to cool an engine. We need high compression, but have to reduce it for fear of pre-ignition. High speed is essential to prevent power from wasting itself into radiator and exhaust pipe, yet we lower our r.p.m. for reasons of comfort, silence or gear losses.

Engines ought to be hot in order that heat may not be absorbed from the exploding gas. They must run cool or they are impossible to lubricate. Combustion should be rapid to ensure fuel economy, and slow to give us an engine that is pleasant to drive or cheap to manufacture. Make petrol hot to prevent condensation, and then make it cold to improve volumetric efficiency. It is all very queer.

Anyone could foresee the supercharger, brought in to help so that in the fraction of a second available to charge the cylinder enough pressure was available to get the mixture past a little valve. It must be a relatively small valve or its loading becomes impossibly high.

So that is my first amusement; it is to stand near an idling bus engine, where fuel is metered by a pump, to overcome the joke of bouncing springs, with valves which never do as they are told, and to listen to the racket. Listen to a high-speed engine, or slow down its movements —there are many of them—by a high-speed camera. It is clearly essential that something should be done.



*The "hammering" effect which goes on within the engine when a car is travelling at 60 m.p.h.*

### Electrically-run Cars!

I believe that in the far distant future, when the transmission of electric energy becomes cheap or its production so easy that waste does not matter, we shall have electrically-run cars on the "Russian factory" principle of induction. Even electric storage may be possible in our grandchild's day. But meantime, reciprocating engines cannot last much longer.

At the moment turbine jet engines, which might eventually give us cars-cum-aircraft, are quite impracticable. So was fluorescent lighting for automobiles a few years ago. It is less than 20 years since internal combustion turbines were jokes. I have made several. All failures, because if metal ran hot it melted, and if cooled it poured useful heat down the cooling water drainpipe. But that has changed. Internal combustion engine turbines are running as power plants and on locos with great success as the result of metallurgical progress.

### Power Wastage

Have you ever worked out the causes of rattle? Modern cars either rattle or waste power. Most large, comfortable vehicles are deliberately wasteful. A 7 h.p. motor will give as much power as one of 30 h.p. if noise and fuss are neglected. Think of exhaust valves. Four of them, each with a 70lb. spring and a load of perhaps 80lb. gas pressure. It needs a pressure of far more than 100lb. before each valve can be opened, and if you will imagine yourself at a fair watching a man swiping at an anvil with a hammer in an attempt to "ring the bell" you have some idea of what progress in automobile design has achieved.

Quite heavy pistons have to be stopped and started many times every minute when an engine is running at 3,000 r.p.m.—a comfortable speed for the driver but not for the big end which, with connecting rod and piston on its back, suffers a loading of several tons per square inch—also many times per minute. One hundred times per second to be accurate. It is because this sort of thing cannot go on that, irrespective of technical considerations, I am so certain reciprocating engines will not last another 50 years on cars. I believe that turbines will come to our rescue and that, given half the time, labour and money spent upon making a 1,000 cc. engine produce 50 h.p. at 8,000 r.p.m., half the bad principles which have been made to work will leave us for ever. Great economy is not the first consideration. Economy is seldom pleasant, and it is "pleasantness" which sells most ordinary cars.

No need to labour the point. Look at your car and think of all that is happening as you drive at 60 m.p.h. My illustration is not exaggerated. No engine can stand hammers for very long.

*Digging a hole for one wheel to sink into when the opposite wheel goes over a bump!*

### Unsprung Loads

For our second case we have springing. Not unlike that of a coach built to travel at 6 m.p.h. over battlefield roads. Our cars have wheels hitting lumps and dents at speeds of 60 or 80 m.p.h., and we have not proportionately reduced unsprung load. It is the inertia of a heavy wheel and axle that causes wear, discomfort or breakage. Breakage we have cured by making the axle heavier and stronger until its response to a blow is so leisurely that the chassis rises with it. There is no time for the axle to move on its own.

Logically, if one wheel on a solid axle is hit up by a moving road, and it is more convenient to consider the problem in this way, the opposite wheel wants to move downwards. Either the car must move as

a whole or the axle must be featherweight. The only alternative is to get out and dig a hole for this opposite wheel to sink into every time one wheel goes over a bump.

This illustration is again not exaggerated, but few people seem to realise that split axles are certain to win the day. To say they do not last is no argument. Since when have independent springs received the concentrated attention devoted to the old-fashioned types which are "utility only" in the worst sense of that unpleasant phrase?

### Gas Turbines

Almost 30 years ago I wrote in the *Motor* that gas turbines, or even inductive transmission, might one day prove useful on the road, and the laughter took quite a long time to die down. My opinion, in conclusion, is not altered by the appearance of the Boering turboprop engine with dimensions of 42in. by 22in., a weight of 140lb. inclusive, of an initial gearbox and a horse-power of 200, without reckoning a static thrust of 50lb. from the exhaust. It is said that it might be useful for cars or boats, a suggestion which to me is far less humorous than any reciprocating power plant yet designed.

Perhaps now that Mr. Strauss, of the Ministry of Supply, has mentioned the possibility of turbines for road transport, something may be done, but as I have only been writing about the importance of gas turbines for 20 years, it is no doubt too much to hope that anything will happen in England until contempt for invention has been fully demonstrated.

These are but a few of the things which cross my mind on a bad road when the hill is medium and the engine doing work to which it is not really suited at all. Internal combustion engines have no true flexibility and are inherently unsuited to traction in their present form. Add to all this the alleged need for reducing the number of car types, the call for standardisation or production at any cost of efficiency and the legal control of design by economic politics. The result from the aspect of imaginative progress is not far to seek. It is a conclusion which is being forced upon nearly every branch of invention to-day.

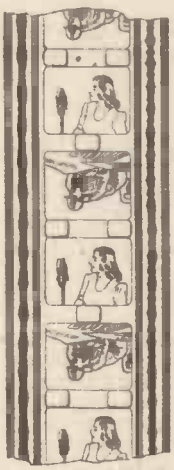
# The Harper Sound Film System

## A Method of Contact Printing Standard 35 mm. Sound Track on to 16 mm. Film

By R. RUSSELL

ONE of the most significant inventions that has taken place in the film industry since the inception of the talkie was recently announced by the Harper Film Systems, Ltd. In a small backroom laboratory Mr. Martin Harper, a pioneer in the development of cinematography, has at last reached an aim he set out to achieve over 40 years ago.

The ideas which prompted the invention were the ever-expanding 16 mm. film libraries, the increasing call for 16 mm. prints of 35 mm. standard films, and the always present cry for better 16 mm. sound reproduction. Together, these requirements were taken up in many countries, and a great deal of research work was undertaken, particularly in America; in fact, hundreds of thousands of dollars were spent there, although no satisfactory solution was ever found. In 1938, however, Mr. Harper patented an invention which completely satisfied this demand. Not only did he satisfy it, but he produced results which surpassed even the wildest dreams. In a nutshell, he found a method of contact printing standard 35 mm. sound track on to 16 mm. Harper film. On top of this he designed and built a projector which not only was a precision instrument of a small size but was capable of projecting standard 35 mm. film on 16 mm. film without the necessity of making any alterations in the projector itself.



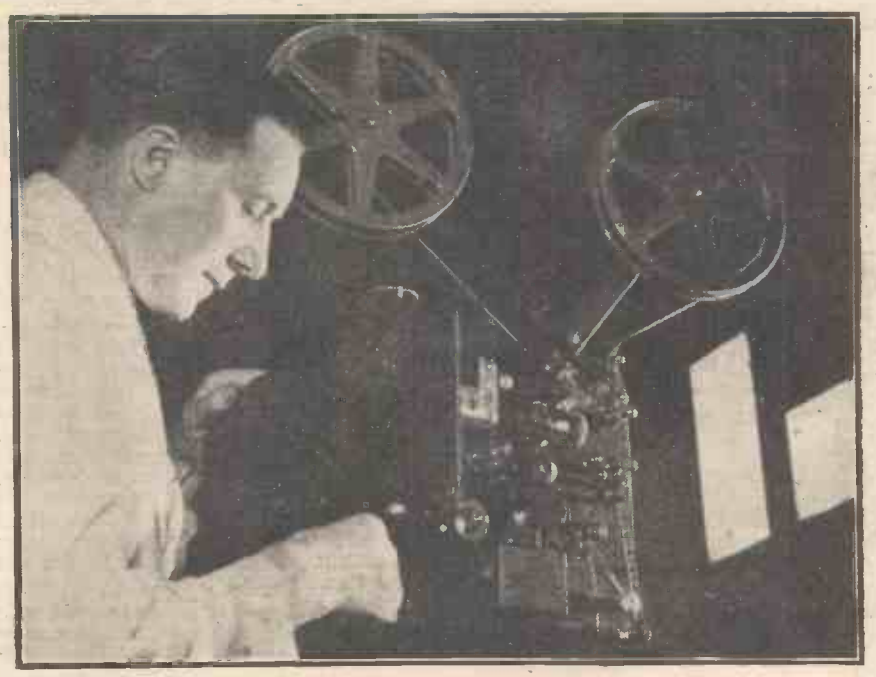
*Alternate frames on the Harper film strip.*

Mr. Harper has redesigned the standard 16 mm. film so that a 35 mm. sound track can be contact printed on to the film, thus giving 35 mm. fidelity on 16 mm. film. This, of course, means that the film has to pass through the projector at the rate of about 18in. per second instead of 7½in. per second. Although it would appear that the amount of film used would have to be almost double, this is not really the case, since only the alternate frames on the film are used during the first run.

### Alternate Frames Reversed

The accompanying sketch will simplify the whole matter. It will be seen that the alternate frames on the Harper film strip are printed upside down and that a sound track runs down each side of the film, while the perforations are made between the frames. During the course of projection the 35 mm. sound track on the Harper film passes through the machine at the rate of about 18in. per second, so also do the frames. But, owing to the fact that the alternate frames are blanked out during the first projection, it is true to say that really only half the film is used during this process. On re-projecting the film without rewinding it the alternate frames are projected in conjunction with the sound track on the other side.

The advantages of this new Harper process are manifold—sound reproduction of 35 mm. quality, high film speed through the projection, no rewinding of films necessary after each projection, a cooler film run, a steadier picture, an ingenious perforation layout enabling a Maltese cross movement to be used in the projector and virtually eliminating the usual wear and tear of film during its passage through the gate. Indeed, after 2,500 test runs of a Harper film, there was little or no signs of wear. Other standard 16 mm. films have become useless after only 50 runs.



*Preparing to demonstrate the Harper sound film in the prototype projector.*

### New Projector

To utilise this new film Mr. Harper and his technical experts have been working on the construction of a projector capable of using both the Harper and the standard 16 mm. films without the necessity of making any adjustments whatsoever. This new projector, which has now been completed, is a precision machine incorporating most of the latest advances in professional 35 mm. projectors. Small in size, compact in appearance and completely transportable, the Harper projector is a fine piece of British engineering skill. Fitted with many improvements, it is a completely perfected projector of the future.

The revolutionary principles involved in the Harper sound system will enable a considerable reduction to be made in the prices of 16 mm. films hired from film libraries.

# THE WORLD OF MODELS

## Trix Twin Trains : Model of Colliery Pithead Baths : Scale Model Liner's Cabin

*By "MOTILUS"*

AMERICAN model railroad enthusiasts are fortunate in having at their disposal an up-to-date magazine devoted to model railway design, equipment and operation. Edited by a keen follower of the hobby, Mr. Albert C. Kalmbach, the magazine covers all phases of the hobby and is well illustrated. The July issue for 1948 gave a report by Mr. Henry A. Kirtland of one of the editor's periodical statistical reviews of the popularity, or otherwise, of the various gauges used for model railways, the equipment, type and method of supplying motive power. It is interesting to note that the order of popularity has not changed since 1947. For the benefit of readers who have not had an opportunity of following the results of these American model railway polls, I am relaying some of the salient points from Mr. Kirtland's 1948 report.

Users of HO gauge (16½ mm.) will be pleased to know that their choice headed the list with 62 per cent. of the model railway owners included in this poll, against 54 per cent. in 1947. Gauge O (1¼in.), which at one time held first place, has fallen to 21.5 per cent. against 28 per cent. in 1947. Of the other gauges included in the review, none exceeded more than 7 per cent. of the total.

Research was also undertaken regarding the type of locomotive preferred, irrespective of gauge. Steam locomotives were the choice of over 69 per cent.; the diesel engine came next with 12 per cent. and electrical locomotives only reached 5 per cent. Among steam fans the "Pacific" was voted the favourite of nearly 18 per cent.; but then the "Pacific" is in greater use in America than in this country.

### Popularity of "OO" Gauge

Reflections on the ever-increasing popularity of 16½ mm. or OO gauge, as we call it here, have reminded me that "Trix" and "Dublo" trains are now appearing on the home market more frequently, despite the continued need and demand for export of these famous miniature trains. Just prior to last Christmas I had the pleasure of visiting the Northampton works where Trix trains are made. At that time it was "full speed ahead" with production for the Christmas home market, to enable many patient, would-be purchasers to obtain sets as Christmas gifts for young friends and relatives. I am confident that by the time this appears in print there will be some improvement in the supply of these well-known model trains, so that they are more likely to be available to all-comers.

*Fig. 1.—One of the testing tracks in the Northampton works where Trix Twin trains are made. Every locomotive is given a performance test before leaving the factory, and this is only one of the many tests made during the process of assembly.*

In walking through the factory, I could not help remarking on the keen interest all concerned displayed in their work. One job some of the younger readers might envy is that of testing the model locomotives. Each one must be tested for starting, stopping and reversing before it is passed out for packing. Our illustration, Fig. 1, shows a testing bench where this essential operation is carried out.

### Trix Trains

Some of the outstanding features of Trix trains are no doubt already known to readers. The bodies of the locomotives are pressure die-cast in a special alloy, a method which also enables excellent external detail to be shown on these small models. The alloy is suitable for realistic painting, giving a very good finish to the locomotives. The electro-motor, a most important item in any working model, is compact and efficient: the armature has a large diameter. Oil-less bearings and adjustable brushes are other noteworthy features.

Many improvements have been made in both hand- and remote-controlled points, which are now neater in construction and take up considerably less space. This is a distinct advantage, as it enables more variety of formation to be used in track layouts, owing to the smaller space occupied.

The track sections, unique in being fitted on moulded, bakelite bases, just clip together and once joined hold fast. They can be taken apart and re-formed into various lay-

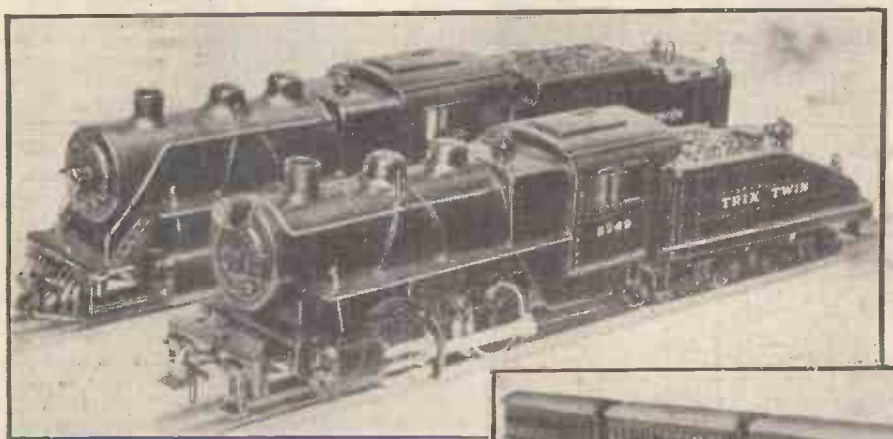



*Fig. 2.—(Above) Two American-type Trix locomotives: a goods locomotive and tender in the foreground and behind it an express passenger locomotive and tender.*

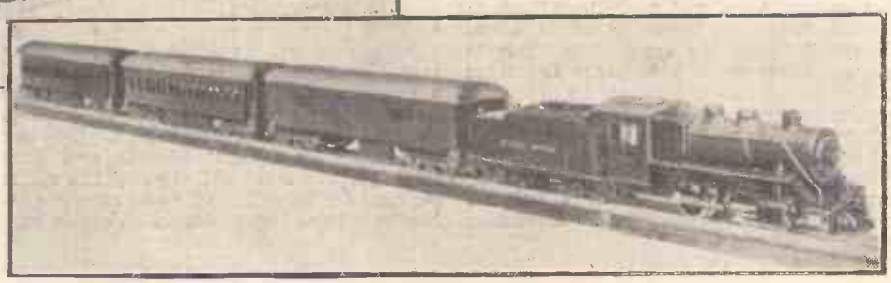


*Fig. 3.—(Right) A Trix American-style passenger train set, consisting of passenger locomotive and tender, baggage car, ordinary coach and observation car.*

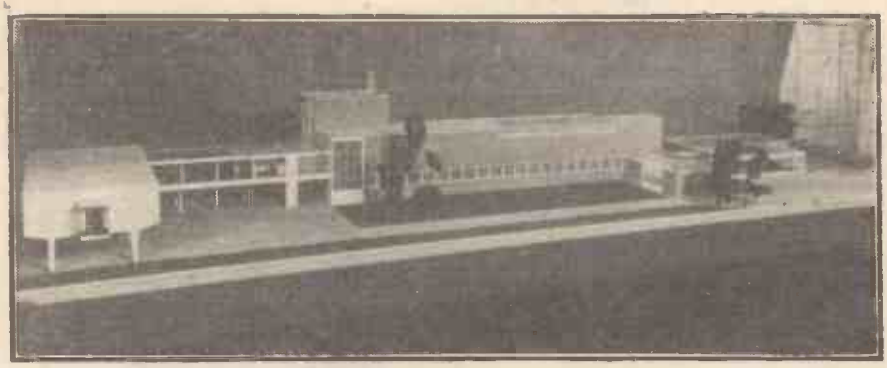


*Fig. 4.—Model of a modern design for colliery pit-head baths. Scale : ¼in. to 1ft.*

outs with ease and speed. Post-war controllers, too, have technical improvements in the internal mechanism, making for a larger degree of efficiency than in pre-war controllers.

All the equipment of Trix trains is sturdily built for long usage, a quality difficult to obtain satisfactorily in small gauge model railways.

### Model Trains For Export

During my visit, trains for export were still very much in evidence. Green electric locomotives and coaches designed for Switzerland and Continental-type steam trains for Belgium. I did not need to be told that the New World was the destination of the small locomotives, coupled to outsize 8-wheeled tenders, and boasting headlamps, cowcatchers and the rows of steam domes so typical of American practice. Accompanying them were box cars, tank wagons and American-style carriages (Figs. 2 and 3). The United States, however, call not only for trains modelled after their own railway rolling stock, but also, as so many of their people have visited this country, for models in British style and colouring, to recall memories of times spent over here. An interesting point is that OO gauge fans in this country also ask for American-type models, and it is hoped that some will soon be available for the home market.

The leading toy stores handling model railway equipment have never been so busy since pre-war days as they were this last Christmas: the first Christmas for some seven years that anything like a comprehensive selection of model railway equipment has been available. Messrs. Bassett-Lowke, Ltd., in High Holborn, London, seemed to be able to produce quite a range of models of all kinds, as well as the castings and finished parts so well beloved of the amateur model-maker. I trust this is an indication of things to come, and that the increase in goods available for model enthusiasts will continue.

### R.S.A. Juvenile Lectures

The extensive activities of the Royal Society of Arts are probably only known to those who make a point of following the affairs of this body, so it may be news to many people that each year, during the schools' Christmas vacation, the society arrange two lectures for young people in London. These are known as the Dr. Mann Juvenile Lectures, the society being able to maintain them through a legacy left them for this purpose by Dr. Mann, and they are open to members of the R.S.A., as well as their young friends and relatives.

Last December two specially interesting talks were given, both accompanied by demonstrations and cinematograph films: one was "Puppets," by Mr. Waldo Lanchester and the other "Model Railways," by Messrs. W. J. Bassett-Lowke and R. H. Fuller, the latter subject drawing a record audience. Mr. Fuller gave a comprehensive survey of the types, sizes and gauges of model railways and included comments on the various means of propulsion: electricity, clockwork and steam. He also spoke of the application of other models for instructional, educational and demonstration purposes. This was followed by a display, on an improvised track, of locomotive control, signalling and points systems and other details of model railway operation.

The last item that afternoon was a series of cinematograph films showing different model railways in action in all parts of the country. The show ended with a humorous film depicting early railways in America. At the close of this entertainment, members of the audience were invited to examine the models on display more closely if they wished and to ask any questions about points that interested them. This they did with much enthusiasm.

### Colliery Pit-head Baths Models

As readers are no doubt aware, facilities provided for our coalminers, improved though they are from former days, still leave much to be desired. The Miners' Welfare Commission, however, are doing all they can to further the miners' interests and have recently endeavoured to bring to public notice the need for better facilities and accommodation at all colliery pit-heads. To this end, several identical models were made last year, showing an ideal layout for pit-head baths, in a building to include, in addition to the showers, a medical centre, canteen and boot-cleaning apparatus. The models were to a scale of ¼in. to 1ft. and were to be displayed at exhibitions and other public gatherings in different parts of the country. One of the models is illustrated in Fig. 4. The establishment of these pit-head baths would be of unlimited benefit to miners who now have to travel home at the end of a hard day's work in their soiled working-clothes, unable to avoid taking the dust and dirt from the mine into their houses. When pit-head baths are erected, the men can leave their mining clothes at the baths centre, use the showers as well as the canteen and medical services if required, and return home in clean clothes and footwear.

### Scale Model Liner's Cabin

It is a pleasure to hear that new British ships are now ploughing the seven seas and helping to ease the transport problem. New models of the latest ships are appearing in the shipowners' offices. One of the latest liners of the Union-Castle Mail Steamship Co., the R.M.S. *Pretoria Castle*, has already proved herself a popular ship, and the cabin accommodation is roomy, straightforward and in the modern style. Our illustration, Fig. 5, shows a model (scale, 3in. to 1ft. or ¼ full size) of a first-class single berth cabin with private bathroom.

Made by Messrs. Bassett-Lowke, Ltd., of Northampton, the model shows in detail all the features of the actual cabin: pale blue walls, mahogany doors and furniture, wash basin in the cabin, bedside recess for books and papers, the window which takes the place of the more familiar porthole and internal lighting which actually functions in the model. Finding material for curtains, bedspreads and cushion covers, etc., with a design to match the scale of the model, is a difficulty frequently encountered in models of this nature. In this Union-Castle model, the material for the window curtains and cushion covers had to be hand painted in order to reproduce a scale pattern. The reproduction of woven cane chairs is also a difficult task, requiring a particular skill, and the one in this model (seen in the illustration standing near the berth) was made by a craftsman of Messrs. Dryad, Ltd., of Leicester.

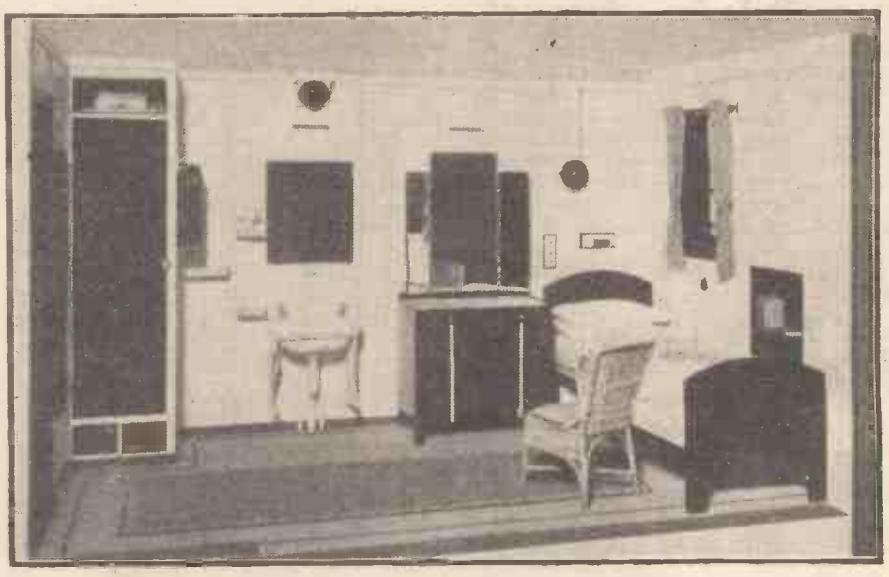
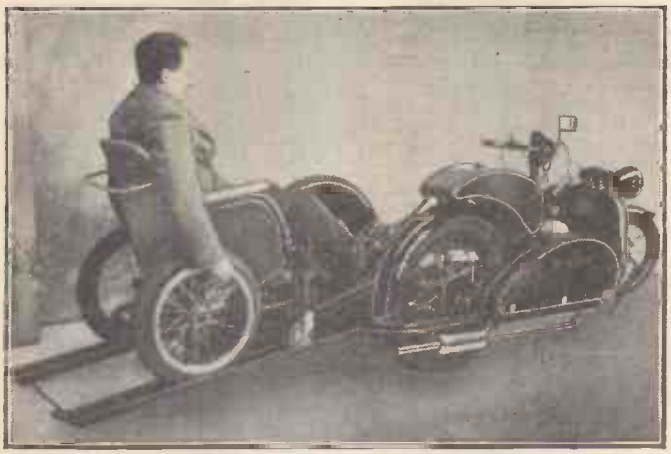


*Fig. 5.—A quarter full-size scale model of the interior of a first-class, single berth cabin on the new Union-Castle liner, R.M.S.* Pretoria Castle. *The private bathroom is reached through a door on the far left-hand side, near the wardrobe.*

# Trade Notes

### The New Era "Invacar"

THIS new machine, the product of Invacar Ltd., of 57, West Road, Westcliff-on-Sea, Essex, realises for the first time the wish of many disabled people. It enables all those using Merlin house chairs to lead a normal social and business life, giving them complete independence of movement at all times and to all places to which they have access in their house chairs. The New Era chassis is not only a very convenient motor vehicle, it also incorporates a very comfortable and manœuvrable self-propelling house chair. By pulling a lever at the side one can raise and lower the ramp which folds up into an inverted "V," and the disabled person can then wheel himself into the driving position. There is an interlocking device which makes it impossible to start the engine until the chair is properly locked in position.



*The New Era "Invacar," showing how the owner-driver propels himself into the driving position.*

The engine is the latest pattern Villiers 125 c.c. Mark 10D, developing over 4 brake horse-power. Petrol consumption: 85/100 m.p.g. Full details concerning specification, specialised controls and prices are obtainable from Invacar Ltd., at the address given.

### Acralac Polychromatic Lacquers

POLYCHROMATIC finishes came into vogue as car finishes before the second world war. At that time there were also a few polychromatic finishes on steel furniture, ashtrays, and similar articles. To-day, this popular finish is applied to cars, cycles, electrical fittings, and many articles in everyday use.

This special finish consists of a tinted transparent lacquer containing finely divided particles of a metallic pigment which produces a soft lustre aptly described as "Jewelescence."

To make these lacquers available for domestic use, Acra Products Ltd., of Acra House, Acrabond Works, Shepley, Nr. Huddersfield, have recently produced them in a small pack containing six jars of distinctive colours.

The latest pack announced by this firm consists of 2oz. jars of model dopes in marigold, vermilion, blue, yellow, black, ivory and silver. The material itself is formulated on a high flash nitro-cotton basis, and is sufficiently slow in primary drying to allow the model builder to apply the dope easily by brush (or spray) in much the same way as an ordinary oil enamel. It dries hard in one hour.

The film produced by this dope is extremely tough and durable, and is designed to give complete resistance to oil, petrol, diesel oil and ether. It also gives good protection against Methanol and Nitro Methane fuels.

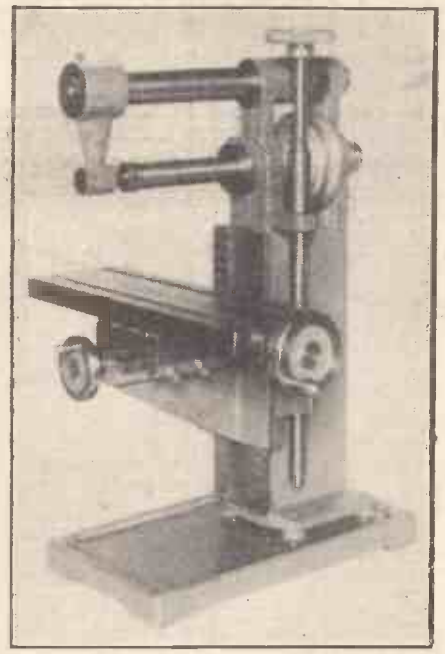
### New Bench Milling Machine

A NEW design specially produced for the small user and incorporating refinements suggested by long experience with production machines has just been introduced by T. Garner and Son, Ltd., Redbrook Works, Gawber, Barnsley.

The castings for this machine are of finest quality grey iron, nickel toughened. Slides are hand scraped and fitted to close limits, and the bearings are of the split-parallel type in cast phosphor bronze.

The three step vee drive gives ample power and speeds for all normal operations. The knee is of rigid design to minimise vibration.

Vertical movement is actuated from the top of the machine, contrary to usual practice. This facilitates operations and obviates the usual trouble of swarf fouling the lead-screw, not to mention the operator's hands. A special bench mounting countershaft motor unit is provided, where required, and the motor (¼ h.p. recommended) fits directly to this unit.



*New bench drilling machine by T. Garner and Son, Ltd. Note how the vertical movement of the table is controlled from the top of the machine.*

**PRINCIPAL DIMENSIONS**

Table Length, 11 inches. Cross Traverse, 2½ inches.

Table Width (2 Tee Slots), 3½ inches. Centre of Spindle to bottom of over arm, 2 inches.

Pulley Diameters: 1¾, 2¾, 3¾ inches. Vertical Movement: 6 inches.

Pulley Section: ⅜ inch Vee. Spindle Bored. No. 2 M.T.

The price is fixed at £20. Further particulars can be obtained from the address given in the previous column.

# Club Notes

### Colchester Society of Model and Experimental Engineers

THE annual general meeting was held at St. Mary's Maw Hall, on January 18th, and was well attended. At the outset of the meeting the aero-model section stated that they wished to form a society of their own, but after much friendly discussion it was decided that they become a sub-section and remain a component part of the society.

The election of officers and committee then followed. The treasurer's report showed a satisfactory balance, and the secretary reviewed the year's working.

The new president, Mr. B. D. Downes, then addressed the members, stressing the value of model-making as an educational course for juniors and an occupational pastime for the advanced.

The society is arranging an exhibition of models for public viewing in April. Modellers living in or near Colchester who would be willing to loan models, either working or for exhibition, please write to Mr. B. D. Downes, "Southernwood," Rowledge Road, Old Heath, Colchester.

New members will be welcomed—hon. secretary, A. E. Andrews, 1, Highfield Drive, Lexden Road, Colchester.

### Eccles and District Model Engineering Society

AT an extra-ordinary general meeting held on January 16th it was decided to broaden the scope of the club and to encourage model engineers interested in all branches of the hobby to join. The club has, thanks to the generosity of one of its members, and the co-operation of the local council and parks department, one of the finest multi-gauge tracks in the north, on which competitions and passenger hauling are regular features. It is hoped now to cater for people interested in other subjects, such as aeroplanes, boats, petrol engines, etc.

Our programme for the year will include, in addition to track events at Winton, lectures, film shows, demonstrations and visits to places of interest, including the Model Exhibition in London.

Anyone wishing to join, whether expert or novice, should get in touch with the undersigned, or come to one of our meetings at St. Catherine's School, Catherine Street, Winton. Meetings are held on the first and third Wednesday of each month at 7.30 p.m. —W. J. Thompson (hon. sec.), 16, Prestwood Road, Salford, 6.

# QUERIES and ENQUIRIES

A stamped addressed envelope, three penny stamps, and the query coupon from the current issue, which appears on page 48 (THE CYCLIST), must be enclosed with every letter containing a query. Every query and drawing which is sent must bear the name and address of the reader. Send your queries to the Editor, PRACTICAL MECHANICS, Geo. Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2.

## *Refrigerants*

**I AM thinking of constructing a small refrigerator of the type which uses a small heating element to convert the liquid to a gas. Could you give me the name of the liquid used and where obtainable, also, the approximate wattage of the element for use on 230 v. supply ?—J. Felgate (Surbiton).**

THE construction of a really serviceable refrigerator is a most difficult task, calling for skill and, above all, practical experience. There are no available books detailing the many intricate details of such construction which is largely a matter maintained secret by the various manufacturers. Hence, if you embark on the construction you must be prepared for disappointments.

Different types of refrigerators use different refrigerants. Some use anhydrous ammonia, others sulphur dioxide. Others, again, use a mixture of ammonia and hydrogen, whilst the more recent types employ "Freon," which is dichlortetrafluorethane. This is not now generally available, but ammonia and sulphur dioxide of refrigerant quality are obtainable from I.C.I., Ltd., London, S.W.1, or through any wholesale chemical dealer. It is very essential that such refrigerants are entirely free from moisture.

A small heating coil of about 40-watt capacity will suffice in a small type of refrigerator.

To give you the details of refrigerator construction would, for the barest outline, in fact, require our writing a small book on the subject. You will see, therefore, that such an "order" is hopelessly beyond the scope of our query-reply service, so that all we can do is to list a few books of refrigeration principles which might be of use to you. These can be obtained (probably secondhand) from any good technical bookseller, such as Messrs. H. K. Lewis and Co., Ltd., 136, Gower Street, London, W.C.1, or Messrs. Wm. Bryce, Ltd., 54, Lothian Street, Edinburgh.

J. A. Ewing: Mechanical Production of Cold.
A. M. Greene: Elements of Refrigeration.
W. H. Motz: Principles of Refrigeration.
H. J. Macintire: Refrigeration Engineering.
N. R. Sparks: Theory of Mechanical Refrigeration.
H. Williams: Mechanical Refrigeration.
W. R. Woolrich: Handbook of Refrigeration Engineering.
J. H. Robinson: Practical Hints on Commercial Refrigeration.

## *Clear Lacquer for Metals*

**CAN you give me a formula for "brass lacquer" using methyl cellulose? What I have in mind is a lacquer similar to that used for chemical and analytical balances—either clear or tinted. Would a methyl cellulose lacquer be also suitable for a wood finish ?—W. G. McFarlane (Glasgow).**

THE following is an excellent clear lacquer for brass and other metals. It is very durable, and can be tinted by the incorporation of suitable dyes:

| | | |
|---|---|---|
| Film scrap | .. | 15 grams. |
| Ethyl acetate | .. | 17 ccs. |
| Amyl acetate | .. | 25 ccs. |
| Xylene | .. | 60 ccs. |
| Benzene | .. | 40 ccs. |
| Boiled linseed oil | | 8 ccs. |
| Tricrescyl phosphate or butyl phthalate | .. | 3 ccs. |
| Meth. spirit | .. | 26 ccs. |

A simpler type of clear lacquer can be made by dissolving clear scrap film in a mixture of approximately equal parts of acetone and amyl acetate. It is not so good as the above one, however.

Either of the above lacquers can be used on wood, particularly the first-named one, but several coats may be required unless the wood has been adequately sized beforehand.

## *Making Coal Briquettes*

**CAN you advise me if there is some readily obtainable substance, which can be bought in small quantities, that will quite simply bind coal dust to form briquettes, and in what proportions it should be used? What drying-off process is required ?—A. B. Durston (Edinburgh).**

THERE is no material which is really suitable for your purpose. The only material which you could use to form briquettes of coal would be Portland cement, but this would render them only semi-combustible.

To make briquettes it is essential that you have a hydraulic press, which must be capable of a pressure of at least half a ton per square inch. Under these conditions, any heavy oil, creosote and even China clay can be used as a binder.

If you could obtain any waste resinous material from a local works, you might be able to use this as a binder, but you would not, of course, be able to get regular supplies of it at anything like an economic rate. In ordinary circumstances, therefore, without the aid of a hydraulic or other type of heavy press, you have little hope of being able to make coal briquettes satisfactorily. The experiment, indeed, is one which has often been tried.

## *Cleaning Oil Paintings*

**I POSSESS some old and valued paintings which require cleaning in order that the detail becomes clear. I shall be glad if you will inform me concerning the best cleaning material and the method of use. Also, is there any literature on the subject ?—E. D. Roberts (Llanelly).**

IT is quite impossible for us to deal with your query adequately within the space of a short reply. There is no reliable literature dealing with the cleaning of oil paintings, although hints on the subject are to be found scattered through numerous books on the technique of oil painting. Some of these should be obtainable in your local library.

**Readers are asked to note that we have discontinued our electrical query service. Replies that appear in these pages from time to time are old ones, and are published as being of general interest. Will readers requiring information on other subjects please be as brief as possible with their enquiries.**

We have in hand for PRACTICAL MECHANICS an important illustrated article dealing with the subject, which will be published in the near future, and in this you should find many items of practical assistance.

In your case, you do not tell us sufficient about your pictures to enable us to give you detailed advice. What is the age and type of the pictures? Are they on canvas or on wood panels? Have they been relined or remounted? Are they varnished? What is their general condition? All these details must be taken into account when framing an answer, and it is just these particulars which are missing from your letter.

However, for your guidance, we may say that the best solvent for removing old varnish is normal butyl alcohol, used hot, with just a trace of ammonia in it. This is a very potent solvent and should be used very cautiously. Other solvents are acetone, methylated spirit, diacetone alcohol, isopropyl alcohol. These should be used warm (take care; they are all inflammable) with a trace of ammonia in them.

The difficulty in removing the varnish from an old painting is to determine whether the varnish has been laid over the perfectly dry painting, or whether a portion of the painting has been done with colours mixed with the varnish. In the former case, the removal of the varnish will reveal the underlying picture in its original colours. In the latter instance, a portion of the picture will be destroyed. That is why one needs to be so very careful when using any varnish solvent, applying it with a soft cloth, and only treating a small area at a time.

If you remove too much of the picture you will have to retouch it in again with oil colours. In any case, the picture will have to be revarnished. This must be done only with mastic varnish, made by dissolving one part of gum mastic in two parts of rectified turpentine, and applied to the canvas with the bare finger. Only rectified turpentine must be used.

## *Removing Ink Stains from Carpet*

**COULD you advise me what to put on a carpet to remove a large red ink stain ?—M. Lickman (S. Woodford).**

YOU do not tell us anything about the carpet on which red ink has been spilled, and, for this reason, our reply cannot be as full as it might otherwise have been.

Fortunately, red ink is notoriously fugitive. If you write in red ink and expose it to sunlight for six months, the writing will almost disappear. We suggest, therefore, that it might be a feasible proposition for you to remove as much of the red ink as possible from the carpet by gentle scrubbing and mopping with soap and water and, afterwards, to allow the sun to shine on the inked area. If this can be arranged, the red ink stain will gradually fade (although, of course, we cannot guarantee that the colour of the carpet itself may not also disappear).

If, therefore, you decide against this slow method, a quicker process is the following:

Make up a paste of *cold* (not hot) water and chloride of lime. When of the consistency of cream, add five times its bulk of *cold* water and filter the liquid through a cloth. Soak white blotting paper in the liquid, and then lay the impregnated paper on the stained area of the carpet. Alternatively, you can very cautiously mop the liquid over the stained area. After the pile has been just moistened with this liquid, dab it over with strong vinegar or, better still, dilute acetic acid (1 in 4). The stain will be discharged, since the red ink cannot resist this chemical bleaching. Immediately, mop hot water over the area in order to rid the carpet of any absorbed solution. Finally, allow it to dry. You must note, of course, that this treatment will have to be done very cautiously, because if the colours of the carpet are in any way fugitive, they will be bleached, also. But generally, given due care, a good job can be made of ink removal from a carpet in this manner.

## *Oil Soluble Dyes for Leather*

**COULD you please help me with a problem concerning leather ? I have to hand Bismarck brown dye, tannic acid and methylated spirit. I have mixed 16 oz. methylated spirit to three small teaspoons of Bismarck brown and having previously cleaned a number of leather gloves with alcohol, I applied the dye. However, the dye does not appear to be fast in the leather. Could you please tell me how to use the Bismarck brown dye as a base so that the dye will be fixed against water ?—S. Hunter (Oldham).**

SPIRIT dyeing of leather is rather useless, since, as you point out, the dye is not fast on the leather material. Some type of oil-soluble dye is essential. There is a special variety of Bismarck brown used for leather dyeing. It is an oil-soluble variety known as "Bismarck Brown R. (Oil-Soluble)," and it is more suitable than the normal water-soluble Bismarck brown.

Two types of dye solution are available. We list these below:

| | | | |
|---|---|---|---|
| A. | White spirit | .. .. | 20 parts (by weight) |
| | Benzene or toluene | .. | 80 parts (by weight) |
| | Dye .. .. | .. | 6 parts (by weight) (approximately). |
| B. | (*a*) Oleic acid | .. .. | 6 parts (by weight). |
| | Dye | .. .. | 10 parts (by weight). |

(*b*) Acetone .. .. 6 parts (by weight.)
Petrol .. .. 100 parts (by weight).

Stir *a* until uniform. Then add *b* slowly, stirring well.

The leather material must be entered into the cold dye bath, which latter should then be raised gradually to near boiling-point and kept thereat for half an hour. It is then allowed to cool before the material is withdrawn from it. Bear in mind the great inflammability of both dye baths.

Spirit-dyed leather can be improved as regards the subsequent rubbing and "bleeding" of the dye by rubbing castor oil into it or, better still, a weak solution of beeswax in castor oil—say, 5 parts of beeswax in 95 parts of the castor oil. Do not, of course, use too much of the oil, otherwise the leather will become everlastingly sticky. Use just sufficient to impart to the material its characteristic pliability. The more the oil solution is worked into the leather between the fingers, the better will be the condition of the leather.

## *Polishing Alabaster*

**COULD you please inform me how to polish alabaster?—S. Penfold (London, N.).**

FOR polishing alabaster use putty powder or alumina. Apply with a damp rag.

Alumina can be made by precipitating a solution of common alum with ammonia, and by subsequently drying and powdering the white precipitate of alumina (aluminium hydroxide) thus obtained.

An alternative abrasive for alabaster polishing is the following:

| | |
|---|---|
| Sodium silicate (waterglass) .. | 1 part (by weight) |
| Raw linseed oil .. .. .. | 1 „ „ „ |
| Powdered chalk .. .. | 1 „ „ „ |
| Magnesium chloride .. .. | 0.2 „ „ „ |
| Water .. .. .. .. | 10 parts „ „ |
| Gelatine .. .. .. .. | 0.1 part „ „ |

Dissolve the gelatine and the magnesium chloride in the water. Add the sodium silicate. Stir till homogeneous. Then work in the chalk and finally add the linseed oil. The liquid will have to be kept shaken, like ordinary liquid metal polish. It is applied to the alabaster surface by means of a soft cloth.

## *Ink Eraser*

**I WOULD be much obliged if you could give me a formula, or the name of a patent preparation, for erasing lines made by waterproof drawing inks (any of the popular brands), on ordinary black and white prints. I find that scratching and rubbing removes the surface of the paper and leaves marks after the operation. The colours of the lines to be erased might be black, red, blue, green, orange or yellow.—J. Byrne (Dublin).**

MANY of the proprietary waterproof black inks contain carbon black and, this being the case, there is nothing whatsoever which can bleach them, carbon being an absolutely stable substance. On the other hand, however, some commercial black inks are made up on a dye basis and, of course, all coloured inks are of this character. Such ink marks can rapidly be eradicated by treating them with two solutions, viz.:

(a) Grind up 1 part of chloride of lime with 4 parts of water. Filter. Preserve clear liquid in an amber bottle. This solution will not keep good for more than a fortnight.

(b) Acetic acid 1 part, water 4 parts.

To remove an ink mark (other than a carbon ink mark) apply a drop or two of solution A, and follow this up with a similar amount of solution B.

## *Methanol as a Fuel*

**I POSSESS a 2-stroke motor cycle and, in view of the fuel position, I require your advice on the advisability of using methanol fuel. Apart from its cost, is it likely to cause overheating or any other damage by normal use? Can it be mixed with petrol or oil?—G. Rothwell (Manchester).**

YOU can use methanol as a fuel (if you can obtain it), but the engine will require a restricted air supply, and you may experience difficulty in starting in cold weather. Normally, you will not get any corrosion from the use of this fuel, but if you use it over a protracted period, and have a long exhaust conduit on your motor-cycle, it is just possible that you might experience a little corrosion at the outer end of the exhaust conduit, that is at the end farthest away from the engine where moisture may have condensed from the hot exhaust gases. However, even this corrosion is not very likely.

Methanol cannot be mixed with petrol or oil, but its use will not influence the normal lubricating arrangements of your engine.

## *Gold-plating Bath*

**I HAVE recently bought 1oz. of gold cyanide of potassium (40 per cent. salts) and would like to know the correct amount to add to one quart of water to make a plating solution.—B. H. Spink (Clevedon).**

THE exact quantity of gold cyanide in a plating bath is really immaterial. On an average the bath should contain about 3.5 grams of metallic gold per 1,000 ccs., and the same solution should contain about 19 or 20 grams of cyanide. It is always best to heat the solution to nearly boiling point for five minutes and then to let it cool down again before using it when freshly prepared.

You can use a gold anode, which will slowly dissolve in the solution, or you can use a platinum wire anode, which will remain insoluble. In this latter instance you will have to replenish the bath with fresh amounts of gold cyanide from time to time.

Do not use the bath dead cold or else you will get a pale yellow gold deposit. It is best to use the bath slightly warm. This will give a warmer and a "fuller" gold shade. Indeed, the "warmth" of the gold deposition increases with increasing temperature up to 60 deg. C. (140 deg. F.).

Do not use more than a 1.5 volt E.M.F. If you do the deposit will be apt to be powdery.

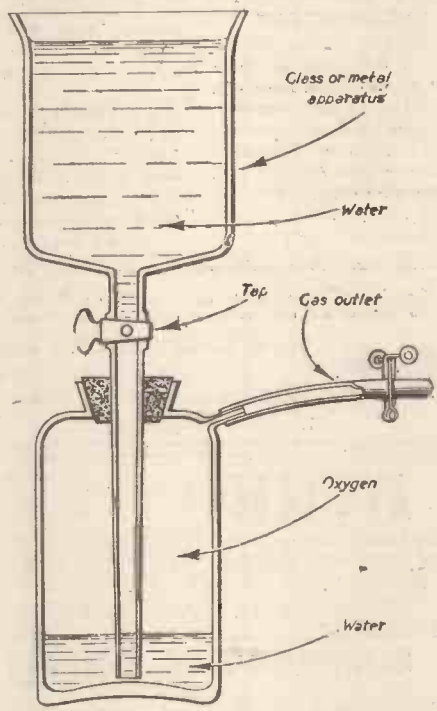
Attention to the above conditions is more important than the exact amount of dissolved gold in the bath. As long as there is sufficient dissolved gold to plate, the bath will work well. When the bath becomes entirely spent do not throw it away. Add it to a new bath. The more a gold bath is worked the "riper" it becomes. What this "ripening" really is forms a matter for conjecture, but the fact remains that, like many other things in life, the older the gold bath, the better it is!

## *Making and Storing Oxygen*

**I SHOULD be glad if you can inform me whether it is possible to construct, in my workshop, a safe form of apparatus for producing a small supply of oxygen at a pressure of about 5lb. per sq. in. as I wish to use a small blow-pipe using ordinary coal gas and oxygen? The use of cylinder oxygen would prove expensive as my requirements are comparatively few, and at considerable intervals, whereby the rent payable on the cylinders would be prohibitive.**

**The largest flame I should require would be about 4½in. long. My chief requirements would be for lead burning but, small and delicate brazing work would not be uncommon.**

**Also, where could I obtain the necessary blow pipe complete with various jets and mixing pipe, or fork fitted with taps?—R. L. Adams (Ware).**




*Apparatus for storing oxygen. (R. L. Adams.)*

YOU are up against a rather difficult proposition—difficult, because, on a small scale, it is not easy to store convenient amounts of gases. For storing the oxygen, you will need two large glass or metal vessels, similar to the sketch given herewith. The oxygen is led into the lower vessel in which it displaces the water upwards. When a supply of it is required the tap is turned on, and the downwards pressure of the displaced water in the upper vessel drives the oxygen in a regulated stream out of the container.

To make oxygen, there are two simple methods. The first is by the action of water on sodium peroxide, $Na_2O_2$. About 7 grams of the peroxide evolve about 1,000 ccs. of oxygen at ordinary temperatures when treated with cold water.

Another method is by treating potassium (or sodium) permanganate with dilute sulphuric acid. Place 20 grams of potassium permanganate in a glass flask along with 100 ccs. of dilute sulphuric acid (1 in 4). Heat the flask gently. Oxygen begins to be evolved at a temperature of about 50 deg. C. (122 deg. F.) and it continues in a steady stream. About 10 grams of the permanganate evolve 1,000 ccs. of oxygen.

You can obtain oxygen blowpipes from most dealers in laboratory apparatus, such as Messrs. Townson and Mercer, Ltd., Croydon, Surrey; Messrs. Baird and Tatlock (London), Ltd., 14-17, St. Cross Street, Hatton Garden, London, E.C.1; or Messrs. Philip Harris and Co., Ltd., Birmingham. Also, The British Oxygen Co., Ltd., Wembley, would be able to supply you.

## *Polishing Perspex : Wadding for Polishing*

**I SHOULD be obliged if you would give me a recipe for:**

**(a) Polish for perspex;**

**(b) Impregnating wadding for polishing metal.—J. Arsbit (Bury).**

(a) PERSPEX resin is usually brought to a polish during its original manufacture. There is no satisfactory polish for easily imparting a smooth, lustrous surface to the matted material. For your purpose the best polish would be a paste made of whiting and paraffin oil, finishing with dry whiting alone. By mixing various proportions of rottenstone powder, you can increase the "bite" of the whiting.

(b) To make polishing wadding, the fabric used must be of the undressed or unsized variety. Saturate them with the following oil mixture:—

| | |
|---|---|
| Castor oil .. .. .. .. .. | 10 parts |
| Spindle oil .. .. .. .. | 10 „ |
| Heavy lubricating oil .. .. .. | 20 „ |
| Benzole .. .. .. .. .. | 70 „ |

Wring the cloths out. Then lay them flat on a wooden bench which has been sprinkled with Tripoli powder. Sprinkle the upper surfaces of the cloths with this powder also. Now run the cloths through a roller or mangle. This will force the powder into the fabric. The cloth will now be partly dry, and they may be finished off by hanging in the open air. Give the finished cloths a brushing with a fine wire brush in order to raise the nap.

The cloths will always be slightly tacky; hence, they will tend to collect dirt. They must, therefore, be preserved under cover.

In place of Tripoli powder you may use plain whiting, or a mixture of whiting and rouge, which renders the fabric suitable for polishing the finest silver. For a coarser polishing medium use silica powder.

## *Curing Tobacco Leaves*

**I HAVE a few tobacco plants and shall be glad if you will advise how to cure and dry the leaves, to give a suitable smoking mixture.—F. J. Tims (Meopham).**

THE curing of tobacco leaves on a small scale is a very difficult task, mainly in view of the lack of experience of the operator and because, on a commercial scale, many of the successful methods are more or less secret.

In your case you can only experiment. Here is an outline of the process:

The leaves should be cut in the autumn when they just become brittle. They are then taken to an outhouse, and hung up over lines. When perfectly dry the leaves are stripped from the stalks. They are then washed in a salt and water solution (1 part of salt in 9 of water). Again they are allowed to dry slowly, after which they are cut up, the central vein or "midrib" of the leaf is removed (this is subsequently dried, powdered, and made into snuff), and then they are moistened and pressed into cakes or spun into the form of rope ("twist").

This will give you a "raw" tobacco. Commercially, the dried leaf is impregnated with saltpetre solution (to make it burn more easily) and it is flavoured with coumarin, vanilla and other flavours. Of the science of this flavouring, very few outside the world of professional tobacco technologists have any knowledge, since the necessary information has never been published. As we said above, you can only experiment.

## *Fixing Wood-block Flooring*

**I HAVE a wood-block floor in my workshop (deal laid on cement base) which is causing a good deal of trouble by the blocks working loose.**

**I undertand that this floor was fixed by pitch or tar, but this is not very lasting. I should be grateful if you could tell me how to properly fix these blocks.**

**Size of blocks is about 10in. × 3in. × 1¼in. thick.—C. E. Baker (Hassocks).**

WHAT you require is a bituminous grouting. This is a fairly soft bitumen mixture which should be obtainable from any asphalting firm in your area. The grouting material is gently melted and, in that condition, is laid on the cement floor base to a depth of about ½in. The wooden blocks are then laid in this grouting. Some workers cover the sides of the blocks with the grouting; others prefer to secure the blocks one to the other by means of short nails, whilst others still use a combination of these methods.

Pitch is not very suitable for the job. It is too brittle and too susceptible to temperature changes.

If you are unable to procure the necessary material locally, write to The Limmer and Trinidad Lake Asphalt Co., Ltd., Steel House, Tothill Street, London, S.W.1.

## *Tarnishing Solution for Brass*

**I WISH to tarnish some brass cap-badges to a brown colour. Can you describe the process?—B. B. Smith (Watford).**

IN a china or porcelain basin mix together a dessertspoonful of slaked lime and an equal measure of sulphur. Cover the mixture an inch or two deep with water. Place the basin in water in a larger saucepan and gently simmer the contents for half an hour. Strain off the yellow liquid resulting.

Dilute one part of this yellow liquor with about 10 parts of water. Immerse the brass articles in the resulting liquid. They will rapidly tarnish and will go through all shades of yellow, red, brown to black. Remove the articles when they have reached the desired shade. Wash them well and then rub them over with an oily cloth after first drying them.

The tarnishing action can be speeded up by adding more of the yellow fluid to the water, but, as a general rule, it is better to have the liquor fairly weak, for, under these conditions, a greater control can thereby be exerted on the tarnishing action.

This process will only work with brass and copper articles.

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**GROUP III** Clerks (General), Cooks and Equipment Assistants.

**GROUP IV** Cooks' Assistants and Stewards.

THE Cyclist
Editor: F. J. CAMM

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**Phone: Temple Bar 4363**
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# Comments of the Month

By F. J. C.

## The 1949 Show

APROPOS our comments anent the show that two Saturdays should be included in its duration, we are glad to learn that the 1949 show has been extended to cover two Saturdays, opening on Friday 21st and closing Saturday, October 29th. The Council of the Manufacturers Union state that they have decided on this course because of the phenomenal success of last year's six-day show, which achieved an all-time record attendance with a very large number of overseas visitors.

## Another Bicycle Record

AS we go to press we learn that Britain has beaten all records for the export of bicycles, for last year, the third in succession, more than 1,000,000 bicycles were sold overseas. The best figures previously were for 1947 with a total of 831,113.

Our bicycle and motor-bicycle exports brought in over £19,000,000, with an additional £6,500,000 for components. Our leading customers were India and Pakistan, who purchased 302,352; British Malaya, 193,029; Union of South Africa, 167,540; British West Africa, 127,227; Eire, 110,711, and the Argentine Republic 104,842. Statistics are not available showing the price per bicycle we obtained from our overseas customers before the war, but we believe that it was a higher figure than we now get. We must not, therefore, lose our sense of perspective on this subject of export. We must not think only in terms of numbers of bicycles exported but in terms of the £ s. d. they bring in per bicycle. Before the war, for example, we might have exported a half a million bicycles to bring in a million pounds. If nowadays we are exporting a million bicycles to bring in one and a half million pounds, our exports are up in relation to the number of bicycles exported, but they are actually down in relation to £ s. d. because, on a pre-war basis, the million bicycles should have brought in two million pounds, which is another way of saying that statistics can be made to prove anything.

## B.L.R.C.—A.G.M.

OUR special representative at the annual general meeting of the British League of Racing Cyclists reports that our accusations that President Durman of the League had told the Minister of Transport that, in his view, massed-start racing on the highways was undesirable, were denied. He admitted that he had read reports in this and another journal, and that he had received a letter on the subject from us; he had thrown the letter into the waste-paper basket. Once again, therefore, we find it necessary to reassert with all the emphasis which print can convey that Mr. Durman, the President of the League, told Mr. H. R. Lintern, of the Ministry of Transport, that he was against massed-start racing on the highway. Mr. H. R. Lintern reaffirms that Mr. Durman made this statement in his presence and that of his assistant, and we challenge Mr. Durman to visit Mr. Lintern, with ourselves, and make his denial in person. He has not had the courage to reply to our letter, nor to our printed comments. Here is a further chance for him to re-establish the confidence which many members of the League have sacrificed in it as a result of our exposures.

Moreover, Mr. Durman knows the redress he had if our statements are untrue. It is because we feel that the London section of the League is endeavouring to dominate it that once again we have declined the invitation to attend their annual dinner, either as a friend or as a member of the Press.

We are astonished that Mr. Durman has not seen fit to take advantage of the opportunity we have afforded him of denying the accusation made against him by Mr. H. R. Lintern. We are only concerned with the welfare of the League, and we should have thought that was Mr. Durman's concern also. It just will not do for Mr. Durman airily to say that the Editor of the *Cyclist* is not a member of the League, and therefore he placed his letter in the waste-paper basket. Such an attitude is interpreted as meaning that the statements we make are true. The waste-paper basket is often used as an excuse by those who wish to disarm too shrewd a criticism.

Now, Mr. Durman, What about it?

## Casualty Figures for 1948

ROAD deaths in Great Britain last year totalled no less than 4,513. It is true that this is 368 fewer than in 1947, and that it is the lowest total recorded for more than 20 years, but it is still far too high. Over 86 people are killed as a result of accidents every year. The following figures are illuminating. Against the year is shown the number of casualties:

1938, 6,648; 1939, 8,272; 1940, 8,609; 1941, 9,169; 1942, 6,926; 1943, 5,796; 1944, 6,416; 1945, 5,256; 1946, 5,062; 1947, 4,881; 1948, 4,513.

The Ministry of Transport announce that for the first time since the war there was a decrease also in the number of non-fatal casualties. These totalled 148,842, a decrease compared with 1947 of 12,476. Figures for 1938 and post-war years are given below:

| | | |
|---|---|---|
| 1938 | Seriously injured 50,975 | Slightly injured 175,878 |
| 1945 | Seriously injured 32,537 | Slightly injured 100,505 |
| 1946 | Seriously injured 36,588 | Slightly injured 120,896 |
| 1947 | Seriously injured 35,697 | Slightly injured 125,621 |
| 1948 | Seriously injured 33,067 | Slightly injured 115,817 |

## December, 1948

While casualty figures for 1948 as a whole show an improvement, more people were killed or injured on the roads in December than in any other month of the year. The killed numbered 547, or 135 more than in November, and the injured 15,525, an increase of 2,396.

This upward leap in the casualty figures, though not unusual during the Christmas season, ended a run of eight months during which casualties had been exceptionally low. The greatest increase was in deaths among adult pedestrians. These numbered 257, or 97 more than in November. Private cars were involved in almost twice as many fatal accidents as in the previous month.

Compared with December, 1947, there was an increase of 99 in the total number of road deaths, and of 4,222 in the injured. This may be partly accounted for by the fact that in December, 1947, large numbers of cars and motor cycles were laid up following suspension of the basic fuel ration. Casualties to motor cyclists last month were nearly three times as many as in the previous December. There were 60 killed, an increase of 24, and 1,452 injured, an increase of 914.

The peak day of the month for accidents was Christmas Eve, when 43 people were killed—the same number as on Christmas Eve, 1947.

The Parliamentary Secretary to the Ministry of Transport, Mr. James Callaghan, M.P., comments:

December accident figures are a warning to us against complacency. During that month, for a brief spell, motor traffic was back to something like normal. The result was an immediate leap in casualties, reaching the shocking record of 43 deaths in 24 hours on Christmas Eve.

Nevertheless, there has been a striking decrease in fatal accidents during the past three years. In 1945, deaths totalled 5,256; last year they were down to 4,513. During the same period the number of motor vehicles licensed rose from 2,500,000 to over 3,600,000.

It is still pedestrians who suffer most. They numbered more than half the people killed in 1948, and over a third of the injured. That is why, as a climax to the spring offensive on road accidents, we are holding a Pedestrian Crossing Week beginning on April 3rd. The offensive is being planned and conducted by the Ministry of Transport in co-operation with the Home Office, Ministry of Education, Scottish Office, and the Royal Society for the Prevention of Accidents. Behind it are over 1,000 Local Road Safety Committees who will be responsible for detailed operations in their own areas. The churches and many other bodies have also promised their support.

About 35,000 crossings in England, Scotland and Wales, are being overhauled and reconditioned in readiness.

# Paragrams


## *Cycle Skis*

AN inventor whose feet, when on skis, seemed to belong to someone else, has invented a kind of ski-cycle. A pair of metal skis are connected together and fitted with toe guards into which the feet are placed. The rider stands on the skis, holds on to a pair of handlebars, pushes off down a snow-covered slope and breathes a silent prayer that he won't hit anything. Should prayer not prove very effective, the inventor has provided a brake attached to the rear of each footrest which enables the skis to be stopped as well as steered.

## *Some Excuse !*

AN erring cyclist, who admitted to Boston Borough magistrates that he took no notice of a halt sign in the town, explained : " I was in a hurry to get to the Inland Revenue Offices to pay my income tax ! " The chairman, looking very surprised, asked : " You don't as a rule hurry to that place, do you ? " The cyclist had his day's expenditure increased by 7s. 6d.

## *Cycled to Recovery*

WHEN his health began to improve after more than a year in hospital where he was being treated for a tubercular knee, young George Sheppard, of Kettering, was told that he ought to take up cycling to improve his health. He read various books and magazines on the sport while waiting to be discharged from hospital and as soon as possible after he got out he began riding. Now he is 20 years old and a leading rider in Kettering Friendly Cycling Club, and during the past year has taken part in 36 events of various kinds, many of which he has won. He is a keen long-distance rider and plans next season to take part in some 50- and 100-mile events.

## *Better and Better*

MR. T. R. SNOWDON, who presided at the 23rd annual dinner and prize presentation of Doncaster Wheelers, referred to the fact that the club was celebrating a year during which it had improved upon pre-war standards, with more members than ever before, more successful events and great social activity in addition to the sporting side. The club has had its most successful racing season since 1940, having won 11 team races and many individual prizes.

## *Crunch !*

TWO boys living in a Huntingdonshire village are bemoaning the loss of their bicycles, and when they get new ones they are going to be very careful where they park them. The other day they left their cycles lying on the grass verge alongside a country road. A tractor, pulling off the road on to the grass to allow a lorry to pass, turned the two machines into a contribution for the scrap metal merchant.

## *Middle East Cycling*

IN spite of the heat, some of which would be welcome over here, members of the Forces in the Middle East are keeping themselves in training with cycling events. Many of the cycles in use are hybrids, and even their makers would not recognise them now. Some are made from bits and pieces picked up in various places, while a few lucky ones have sports models, but the riders are keen and put up good times, in spite of poor roads and other difficulties, and find plenty of fun.

## *No Way Out !*

" BUT it wasn't a vehicle, it was a bicycle," complained a cyclist who was charged at Loughborough Police Court with failing to observe a halt sign while on his " vehicle." The magistrates' clerk looked at the summons and told him : " You can take it from me a bicycle is a vehicle for this purpose." The law always has an answer ready for those who think they can trip it up !

## *Edgehill Monument*

WARWICKSHIRE County Council has given authority for the expenditure of £300 by the Council's Records Committee on the erection of a monument to the Battle of Edgehill fought in 1642, and the first battle of the Civil War. The monument will be erected on the battlefield and will consist of two round memorial stones, about 6ft. high, each bearing a short inscription in bronze with details of the date of the battle and of the site where those who were killed were buried.

## *Change of Sport*

AS a change from cycling, teams from the two Peterborough clubs, the Clarion C.C. and Peterborough C.C., met and played a football match on Boxing Day. Clarion was beaten by five goals to two, and so successful was the match that the two clubs are planning to make it a regular Boxing Day fixture.

## *Cold Work*

RIDERS taking part in the first event ever held at Christmas by the St. Neots and District C.C. felt in great need of a little drop of something warm when they dismounted. The event was a 25-mile T.T. and every rider crossed the finishing line covered with Christmas decorations in the shape of hoar frost and little icicles.

## *Off to Folkestone*

MR. H. FOSTER, of 211, Walton Back Lane, Chesterfield, who since 1935 has been manager of the Halford cycle branch in Cavendish Street, Chesterfield, has obtained a similar appointment in Folkestone and will be leaving in early February. Mr. Foster has taken a considerable interest in local affairs and he is also president of the Chesterfield Chamber of Trade. Unfortunately he will be unable to complete his year of office, owing to his new appointment, but he will be able to represent Chesterfield at the annual National Conference of Chambers of Trade which is to be held at Folkestone in May.

## *Britain's Oldest Cyclist ?*

MR. HARRY MONUMENT, of North Somercotes, Lincs, for many years a member of Grimsby Cycling Club and still a rider at the age of 86, claims to be the oldest active cyclist in the country. He can regularly be seen on the road, and in bitter weather he rode from his home to Cleethorpes to attend a dinner given for old age pensioners. Ever since he bought his first boneshaker for half-a-crown—it was very hard on shoe leather as, of course, it had no pedals —in 1875, he has travelled the roads on two wheels, and he attributes his present good health to his many years as a cyclist and to the fact that he practices moderation in all things and gets as much enjoyment out of life as possible. One of Mr. Monument's favourite stories is of the day in 1892 when he took part in a very hectic race in Yorkshire and " by accident " knocked down eight of the other competitors.

## *Time Trials Council Chairman*

MR. C. BEEBY, of Peterborough, a life member of Peterborough Cycling Club and vice-president and founder of the Fenland Road Riding Association, has once again been elected chairman of the Eastern District Road Time Trials Council—the governing body controlling road events in the area. Mr. Beeby is one of Peterborough's veterans, and has been a keen rider for many years.

## *In a Hurry*

SCUNTHORPE magistrates, hearing a charge against a cyclist who passed the traffic lights at red, were told by a police constable that when he asked the cyclist why he did not stop, he received the reply : " I have had twenty pints of drink. I can neither hear nor see anything, and I want to get home to my wife." Probably he was hurrying home before there was an accident, but anyway the unsympathetic magistrate fined him 10s. for passing the traffic lights and another 10s. for riding without a front light.

## *A Ghostly Story !*

A CYCLIST riding to work at an airfield in the East Midlands did the trip in record time the other morning. He left home well before the unearthly time of 5 a.m. and when he reached the airfield he was in a shocking state, saying he was between the church and the local public house when he saw a figure dressed all in white sitting on a chair and waving its arms in the air. Naturally, the public house was closed at the time. Two R.A.F. service policemen went back with him to investigate, but as these gentlemen believe in no creature that cannot show its pass they, of course, saw nothing. But the cyclist still sticks to his story.

## *Boston Cyclist Injured*

JOE POPPLE, one of Boston's best-known racing cyclists, had to receive hospital treatment after being involved in a collision in the town with another cyclist. Both riders were thrown from their machines and severely shaken and Mr. Popple had to have two stitches inserted in his head. Most of the force of the impact was taken by Mr. Popple's vacuum flask, which he was carrying in his pocket home from work. The flask was almost crushed double. This crash, says Mr. Popple, shook him up more than a crash he was involved in at Herne Hill when he sustained 18 various cuts and bruises.

## *Grimsby 21st*

GRIMSBY Road Club, the oldest active cycling club in the town, has celebrated its 21st birthday with a special gathering and social run. The club was founded in 1928, but in 1939, when other more important jobs were to be done, it went into a state of suspended animation and was not re-formed until 1946. Club members have broken many local and other records, and one, Mr. H. Marks, was the first Grimsby rider ever to win a certificate for averaging 20 miles an hour over three courses in the National Best All-round Contest.

## *Once Seen !*

THE Chief Constable of Huntingdonshire, at a meeting of the County Road Safety Committee, suggested that every person who thinks the work of the Road Safety Committees is not important ought to see a really bad road accident, or see the results of such a crash in hospital. Fatal accidents in the County during 1948 fell by half and there were also fewer accidents to children under 15, none of which was fatal. The Committee is this year arranging to hold proficiency tests for child cyclists. No cyclist will be able to take part in these tests unless his or her cycle is completely roadworthy.

## *His Mistake !*

A MARKET RASEN man who appeared before the local magistrates charged with the theft of a lamp worth 5s. from a bicycle, gasped when the chairman of the Bench said he would be fined £5 or sent to prison for two months. " You meant the fine to be 5s., didn't you ? " he asked. The chairman told him : " No, I said £5. Your record is an extremely bad one, and if these cases continue you will undoubtedly be sent to prison. We want to avoid this, but you will have to pay £5."

## *Cycle Agent's Sudden Death*

SHORTLY after having his breakfast on January 9th, Mr. John William Nelsey, for many years in business as a cycle agent and garage proprietor in Main Street, Stickney, Boston, was taken ill and complained of pains in his chest and very soon afterwards he collapsed and died. The facts were reported to Spilsby District Coroner, but he decided, as a post-mortem examination revealed that death was due to natural causes, that an inquest would not be necessary.

## *" To the Common Danger "*

" YOU come down the street on a Saturday night and forget yourself. It's a pity you can't be merry on a Saturday," said a Hinckley (Leics) cyclist to a policeman who pulled him up and suggested he ought to ride a little more carefully. The constable told the local Bench that the cyclist was riding through the Market-place, swaying from side to side and shouting continuously, so the magistrates fined the merry cyclist £3 for making a loud noise at night and riding a bicycle to the common danger.

## *Woodman, Spare that Tree !*

MEMBERS of Downham Market Rural District Council have decided to oppose strongly a suggestion that an oak tree, believed to be at least a thousand years old and standing in the middle of the main road through the Norfolk village of Feltwell, shall be cut down. It has been suggested that the tree ought to be cut down to make room for a traffic island.

## *Good-bye, Mr. Jimp*

MEMBERS of the North Midland Accident Prevention Federation, meeting at the Town Hall, Leicester, for their quarterly conference, agreed that the Traffic Jimp is one of the most unpopular ideas ever thought up to help road safety. One delegate said : " He tells people what not to do, and that is bad psychology," and several referred to the fact that the Jimp's comments, taken at their face value by children, would lead to accidents. The meeting's decision was : " We don't want him ! "

## *Wheels Beat the Cards*

AT the silver jubilee dinner of the Leicester Forest Cycling Club, held at the Victory Hotel, Leicester, one of the founder members of the club, Mr. Ramsey Pointon, mentioned that the formation of the club was more or less accidental, as it came into being after a group of friends had held a whist drive which " flopped." Cycling proved far more attractive than sitting round little tables playing cards and the club has made good progress ever since. Another disclosure by a speaker was that when the club was originally formed it had a distinct political bias : the club is non-political these days.

## *Club's 74th*

RICHARD DIMBLEBY, in Peterborough to make recordings for the B.B.C. programme " Down Your Way," caught Mr. Cecil Beeby, secretary of Peterborough Cycling Club, as he was on his way to the club's 74th annual dinner. " Have a good time at the dinner," said Mr. Dimbleby. " I understand yours is the oldest cycling club in the world." The club claims to be the oldest active cycling club in the country and its claim has never been disputed. At the present time the club has some 150 registered members and a good proportion were able to attend the dinner. When the club was first formed it was known as Peterborough Tricycle Club, and it became Peterborough Bicycle Club when those new-fangled penny-farthing bicycles came on the market and all club members rode in blue uniforms with blue peaked caps. The captain had the honour of blowing a bugle as the riders approached a village or town.

# Around the Wheelworld

By ICARUS


## Extravagant Views

ONCE again I find it necessary to cross swords with G.H.S., who writes a regular weekly article in a contemporary. This is not the first occasion on which I have had to criticise this contributor for his extravagant and irresponsible comment. But his article under the title of "The Chartered Libertine" cannot be allowed to pass. In this article G.H.S. endeavours to answer the question set as a sub-title to his article: "Are motorists a privileged class?"

The article deals with newspaper criticisms of the police in concentrating so much attention and manpower on trifling technical offences connected with motor-cars, such as parking, exceeding the speed limit in the parks, and so on, whilst so many murderers go undetected.

The *Evening Standard*, for example, in a reasoned editorial, said: "How much time is wasted on hounding motorists by police who should be hunting criminals? In 1947 the police issued 116,000 summonses for traffic offences and 50,000 written cautions. It is totally unnecessary for thousands of constables to spend their days catching motorists, and attending police courts to prosecute them.

"The police should lay off the motorist until the gangs of criminals who now roam this great city have been rounded up."

Now, any sensible person would agree with those views. We all know that the police, anxious to have a little time off, and to earn overtime pay, find motorists an easy way of achieving their object.

Once a case has been heard the policeman has the rest of the day off and he is paid overtime whilst he is in court. This system has been responsible for the police taking the line of least resistance and concentrating on technical offences instead of on crime.

The police reply to the criticism is that in the London area the 31 murders must be considered in relation to the 535 road deaths, and the inference is that the police should go on prosecuting motorists for parking offences, and similar technical offences, in an effort to prevent road deaths which are still at such a deplorably high level. Not by any means all of the large number of cases brought against motorists deal with speeding which presumably G.H.S. thinks, in spite of police evidence to the contrary, is responsible for these road deaths.

This argument has been plugged so much by the C.T.C. and its official and semi-official spokesmen that it is time someone drew their attention to the correct method of analysis. The facts are that all of the methods introduced in the name of road safety, plus the increased attention which the police give to road traffic, have failed to make any appreciable impression on the accident problem. I reject as untrue the suggestion that motorists are responsible for the majority of road accidents. These in many cases are due to carelessness of pedestrians. And as one who uses a car throughout the year as well as a bicycle, I am more qualified to express opinions on this subject than G.H.S., who has exhibited over a long period of years an anti-motorist complex.

The accident problem is undoubtedly a matter of grave concern, but at least an accident is not a deliberate act. Murder is.

To label motorists as Chartered Libertines is altogether too irresponsible, and I am astonished that any editor should permit such a title to go in print. A libertine, for the information of G.H.S., is one who leads a licentious life, a rake, or a debauchee. Presumably, however, G.H.S. intended the word to mean one who enjoys unqualified freedom, yet, how he can square this in view of the large number of prosecutions brought, and remembering that there are over 2,000 regulations covering the construction and use of motor vehicles, I cannot understand.

No one suggests that motorists should be granted the unrestrained freedom of the road, but they object, and will continue to object, to being submitted to what amounts to a subtle form of taxation. It is monstrous to suggest that the police should waste their time watching a stationary motor-car with the hope of getting a little time off and some overtime pay out of it.

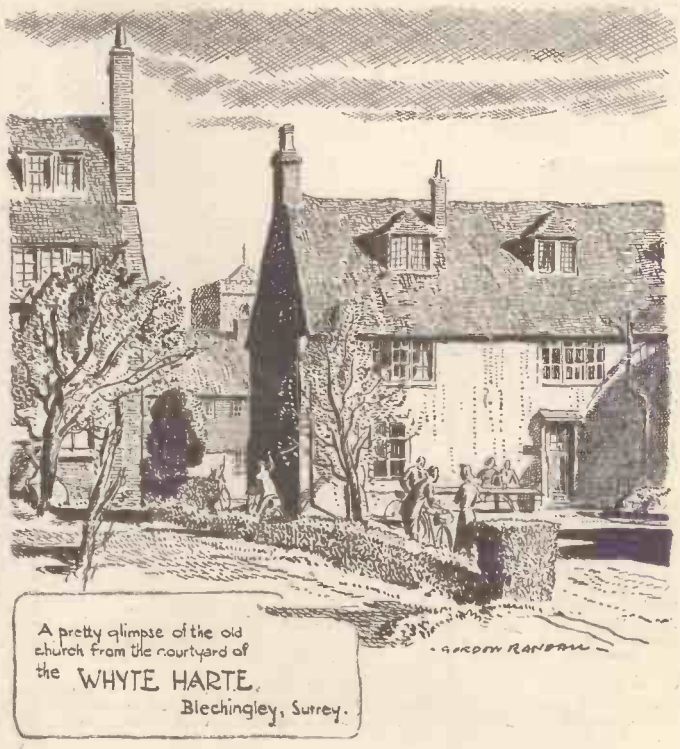
The contributor draws attention to the fact that cyclists hated rearlights; but there is not an outcry every time a cyclist is summoned for failing to show a red light now that red lamps are forced upon them. G.H.S. conveniently omits to say that the C.T.C. in its early years were loud in their condemnation of horse-drawn vehicles which were not fitted with rearlights.

Yet cyclists object to them, and still do object to them. I wonder what the attitude of G.H.S. would have been towards motorists if the C.T.C. had, as was once proposed, changed its articles of association so that its members could include motorists? Would he then have referred to them as Libertines of the Road? It is sheer nonsense for him to say that there is a tendency for motorists to consider themselves a privileged class who are permitted to disregard laws whenever these happen to be irksome. G.H.S. must here have in mind the particular brand of cyclist I wot of.

I am in favour of calling off the police and putting them on to the protection of life and property. There will still be sufficient left to catch the dangerous driver, and the man who blatantly breaks speed limits in dangerous areas.

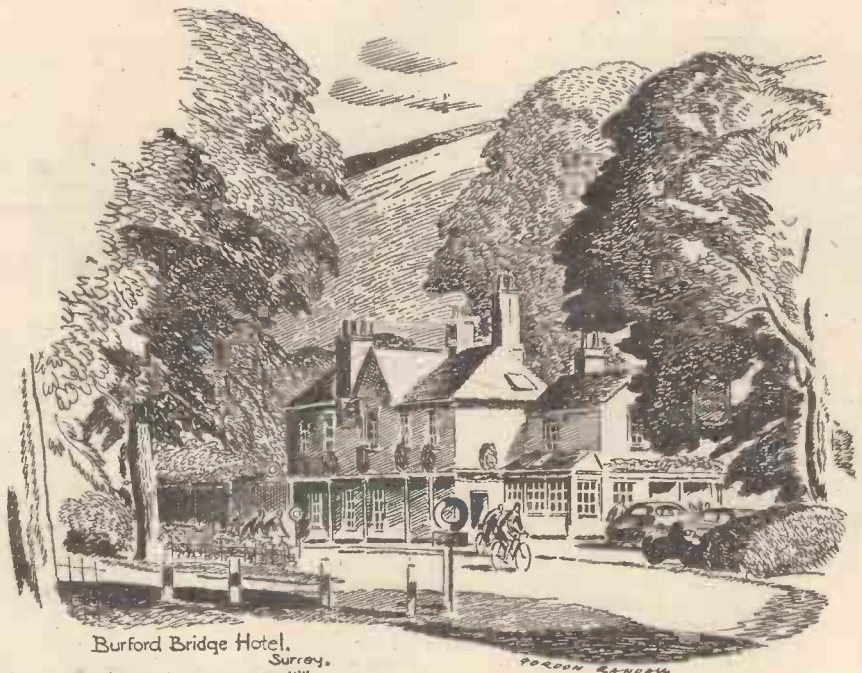
## Cycle Show

THIS year's Bicycle and Motor Cycle Show has been extended to cover two Saturdays, opening on Friday, October 21st and closing on Saturday, October 29th. The Council of the Manufacturers' Union announce that they have decided to open the show for eight days because of the outstanding success of last year's six-day show, which achieved an all-time record attendance, with a very large number of overseas visitors.



# Wayside Thoughts

By F. J. URRY



Burford Bridge Hotel. Surrey.

The famous inn beneath Box Hill where Nelson stayed before leaving to command at Trafalgar.

## *Taking it Easy*

THE values of cycling to a utilitarian are immense. The habit of the exercise is continuously with him, good weather and bad, and he learns by experience the easy way to meet all conditions and make the travel as comfortable as possible. Which means that when he goes touring or week-end wandering, not only is he fit, but he knows how to use his energy to meet all contingencies of the road, and so to enjoy the going, without the worry of what may happen before his day's ending. To be free, mentally and physically, is among the greatest joys of life, far too rarely accepted by the worrying roamer who is so often wondering what may occur in the hours ahead that he unconsciously introduces haste into his travel and thereby frequently spoils the comfortable in a tension of touring. This widespread habit can be seen on any stormy day when all sorts and conditions of folk are hurrying to work or home. It seems to be common to all people, a kind of impatience imposed by the weather, and in my opinion is the direct cause of many avoidable accidents. It appears as if the community was frightened into haste by the "useful nuisance" of the rain, whereas it is certainly true that damp conditions are far better accepted with a slower tempo, which is safer, more comfortable, and far less drenching to the rider of a bicycle. On wet mornings I always try to make a slightly earlier start to arrive at the works at the normal time, and have found that by so doing the risks are reduced, the going is easy and comfortable, and the end of the journey, when the macks are removed, shows nothing worse than spattered toe-caps. True you need the right protective clothing, but every wise cyclist knows that, and it is easy enough to obtain now the garments are coupon free. So I shall not give up my daily journeys, they are far too precious as a means to fitness, and the continual acquisition of that individual freedom which is a big virtue of cycling.

## *The Best of It*

I DO not expect everyone to agree with me on these matters; I do not always agree with myself. By that I mean if I am "under the weather" the comfort of home has the greater appeal, for we are not always on top of our form. But this rarely happens to me, and it must be a very bad week-end, or I must be well "out of sorts," if I do not manage to knock up at least forty miles of riding. This is not taken as a ritual but as an enjoyment during and after the performance. And that "after" is important. For sometimes you start off on a really unfavourable morning with the feeling that the exercise is an excuse for foolhardiness, but ten miles along the road and you are conscious there is nothing to equal this sort of thing on this sort of day; there is nothing else you could do within the world of activity and still keep warm and reasonably dry. And what always impresses me is that the countryside is so quiet, and all the insect-folk the sunshine attracts are tucked away in armchairs and regret the outside conditions. The way to enjoy life is to go out and meet the conditions, they are seldom so bad as they seem; and the people you find along the way are inclined to make a little fuss of you, because the weather has been no bar to your roaming; and that fuss is quite comforting in these times. Besides, it is about ten to one that you will journey home in fine weather and discover—not for the first time—how gracious it is to move smoothly without the rustle of mackintosh wrappings. And when you get to the threshold it is then that the "after" enjoyment begins, that happy, satisfied feeling of having achieved something, of having seen the smoke of storm steam along the hills, heard the thresh of the woodlands and the piping of a challenging blackbird satisfied with a brave meat meal as the result of the storm. So you settle to a book and may-hap hear Hilaire Belloc boom through the pages.

## *And Such Rewards*

THOSE are the stormy days, well used if you are wise and would keep fit, reasonably young and attached to the countryside. There are others, the good hours when the sun shines out of a pale sky and the road calls you across the shires to the distant hills. They provide a little holiday in the midst of winter, with an ingle nook here and there whereby to warm your feet and acclaim the host for his hospitality. I remember so many such that I am always longing for the next, and sometimes the weather annoys me for being so beautiful in mid-week when work claims my attention, and then breaking into riot on the free days. But it doesn't always happen like that, and only a few weeks ago I was out on one such day among the little valleys where the remnants of Arden Forest still stand in the majesty of their winter nakedness. How beautiful trees are with the sunshine among their bare branches and their shapeliness tracing the background of the sky. There had been heavy rain the previous day, and the glisten in the air gave an atmospheric coating of beauty to everything and a clarity so seldom encountered in high summer. All the loveliness of roaming is not confined to the regular holiday seasons; it spills over on such days as these and seems more beautiful because it is unexpected. In a sheltered corner defying the entry of the knife-edged wind it was warm enough to smoke and look on a scene of peaceful joy that wrapped me round in comfort and for the moment made the world a most desirable possession, for during that half-hour it all belonged to me. And I think that is one of the great satisfactions of cycling; you go out alone, or with appreciative companions, and by your own efforts, under your own power, capture a contentment transcending all the desires of mankind without disturbing a single individual with your mental acquisitions.

## *Not for Me!*

I BEGIN to wonder if I have correctly sensed a notion that the industry—and particularly the tyre people—are endeavouring to standardise all of us to the 1¼in. size tyre? I can buy quite a lot of first-class tyres of that diameter, but find it exceedingly difficult to supply my need for the 1¼in. size. The same remark also applies to lightweight rims. Now, I have no criticism of the smaller diameter tyre, and if you prefer it, well and good; but personally, I find the slightly larger section is far more comfortable, very little heavier—it saves weight in rim almost as much as it loses in cover—and is especially adapatable to the rougher ways of lane riding and town travel. Every working day I ride just over five miles over setts, and the difference in ease, and I believe speed if you want it, between the two tyre diameters is remarkable. The regular rider wants comfort, which not only means ease of running but the killing of vibration, and the latter virtue is important, particularly as one grows older. Perhaps the pressure of demand has impelled tyre makers to concentrate on one type for the time being, and they have chosen the 1¼in. size to satisfy the younger people—and one can't blame them for that—but when a dealer tells me that the 1¾in. is old fashioned and unnecessary—a dealer who does not ride a bicycle—I naturally become suspicious. I have no desire to be vibrated unduly, and to escape such discomfort have to forsake my beloved lanes and tracks, so I want the old compromise of the 1¾in. size, lying so comfortably between the 1½in. and 1¼in., to remain, and for the sake of the real tourist and utilitarian to become as popular as the 1¼in. and the high pressure is to the club rider and the racing man. There is a good deal more in the riding of a bicycle than scampering from place to place as fast as your machine will allow you, and I am of that type desiring all the lightweight amenities combined with the easy comfort of long-distance touring.

## *On Raiment*

THERE was a crust of ice on the puddles and "through the sharp hawthorn blew the keen wind" as I went down the road gloved and jerseyed and reasonably protected from the biting breeze which had a knife-edge despite the sunshine. It was a jolly morning to be out, providing you did not loiter except in snug places, and I met a lot of people greeting the glory of this winter's day. But despite jerseys and mufflers some of the riders, boys and girls, looked chill in their shorts, and I wondered if I could enjoy cycling by baring my knees to the wintry blast. Perhaps it is the ancient blood in me that will not keep me warm as of old, or perhaps I am over-fastidious in the matter of personal comfort, but I confess, while I admire the hardihood of the winter shortists, they make me feel shivery by the very sight of their blue knees. Apparently they think nothing about the matter, for that is their reaction to any queries, and if that is true why worry? Still, I cannot understand the popularity of this cycling costume when the thermometer is low and the wind icily laden. And for this reason: some of the people I meet on working days bestride bicycles in a raincoat and long strides; and I know they wear overalls atop of their ordinary garments when working, and yet at the week-ends they cast their clouts for the sketchy garments of a summer day except for the concessions of mufflers and jersey and gloves. One would imagine bare knees would go with bare hands, but it doesn't work out like that. For six days a week they parade as do ordinary mortals, but on the seventh shed half their raiment, sometimes shiver, say they like it, and apparently take no harm. That is a fact, too, as far as I know, and a very remarkable one; which says much for the efficacy of fresh air or the value of cycling as an exerciser, or both.

## *Get Acquainted*

ALL my life from "teen-age" I have had to do with clubs and club life, and, though during these latter years I have fallen out of the heat and burden of the day because for the main part the younger generation is a trifle too slick in its movements for me to keep in association, I still ramble to the meeting places occasionally and renew the old joys of wheeling criticism over the teacups. Personally, I think that without a knowledge of club life and all it connotes it is difficult for a cyclist to consider himself complete, however excellent his private companionship. So I shall remain a clubman for the remainder of my period on this sphere, and renew at odd times all the memories and associations that have made life so full and varied. I wonder if we realise how much we owe to that host of people who through the long years have given service for the benefit—the abiding benefit as far as I am concerned—of their friends and comrades? So many people drop out of club life when it has served their term of sporting activity and forget their debts to the older generation that helped them, and are not prepared to discharge like services to the younger folk, which is the only way they have of repayment and is indeed the very spirit of clubdom. We were discussing the very point one teatime, and to the older people present it was astonishing to remember the names of so many men who had fluttered the sporting interest for a year or so and then disappeared. It is a pity, for the sense of loyalty is a fine thing to hold for a sport and pastime that has given you joy and possibly some treasured reward as a reminder of the old days. But far worse than this, so said an old treasurer official, is the individual who just fades away by the process of non-payment of subscription. That, he averred, is an insult to the club and its officials, and far too many such people are tolerated far too long.

## *Fuel for Muscles*

THE problem of obtaining food along the road does not seem to improve. In your home district you know where to go, but wander outside that orbit and you are never sure of even the plainest sustenance, and far too often a welcome is wanting. The difficulties of the caterer are considerable, I agree, but if he desires to remain in business when the food problem becomes easier for all of us, he must try to do a little better now, and be a trifle more reasonable in his charges, or he will drive all of us away and, whether we like it or not, make us carry our meals. Many are doing it to-day, more will follow to-morrow as the home food problems ease. Twice this last year I have been stranded with hungry and painful miles to travel owing to blank refusal of caterers to supply even the simplest of fare. I had dropped the wartime habit of carrying some sort of foodstuff to fill an emergency and was properly caught. Never again, for a hungry cyclist can be an unhappy individual, and even to-day the catering conditions are not so difficult as to promote the point-blank refusal of any sort of aid.

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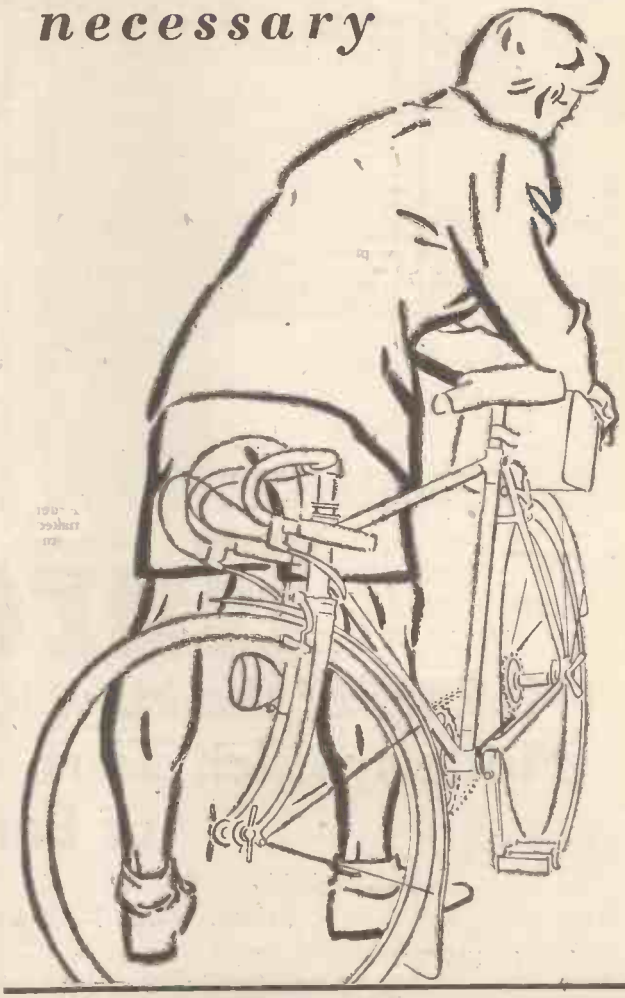

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# CYCLORAMA

By H. W. ELEY

*Evening at Farnham Castle, Surrey. Long shadows from the cedars fall across the lawn in front of the massive red brick tower built by Bishop Fox early in the 16th century.*

## That Spring Feeling

TRUE, the March winds may blow, and there may be snow in the air . . . but, let us remember that according to the calendar spring begins, officially, in March, and so let us be glad that the time of the singing birds is nigh again, and that as we tramp over the meadows we may find a shy celandine, and, if we will take the trouble to explore the grassy dell, we may be rewarded by the sight of virginal snowdrops . . . the heralds of all the spring flowers to come. And there is no better time for a long ride into the countryside than these sharp, bright days of March. The early lambs are frisking in the fields; a lark soars high in the blue heavens, and I look forward to Easter . . . late this year, but then that should mean sunnier days, and I must plan my Easter tour. Easter, to cyclists, is the first and best "carnival of the road."

## Getting Back to Normal

WE may be still some distance from the full and normal days of peacetime, but there are nevertheless welcome signs that manufacturers are surmounting the manifold problems of the post-war days . . . and it is good to see that the ranges of cycle tyres, with their specific "brand names" are back again. Thus, the choice of the cyclist is wider; he can again purchase his favourite "grade"—designed for specific purposes—for track, for road, for tandem work . . . much credit is due to the cycle and tyre makers for the way in which they have overcome their difficulties and kept their industries in the van.

## A Veteran Rider

IT is a long cry back to the year 1889, and the world was a very different place then. I was reminded of this the other day, when I came across the name of "Bob" Carlisle, that wonderful old servant of the Dunlop organisation. "Bob" is still working, and attends at Fort Dunlop every day! As most cyclists know, he rode in the epoch-making cycle race held at the Queen's College Sports in May of 1889—riding in company with the immortal William Hume, who won the race, and demonstrated to a sceptical public the virtues of the pneumatic principle. I have known "Bob" intimately for many years, and I gladly salute him . . . may he be a Dunlop "figure" for many more years!

## Trevor "Bullaker"

THAT was the way my old friend Trevor Laker, of the John Bull organisation, described himself on a delightful card he sent to me at Christmas. Since then I have seen Trevor, sat with him on a committee, and I rejoiced to see him so fit and well. I imagine that Leicester agrees with Trevor, and that he finds the hunting shire a pleasant place of abode. Many will recall his good work on the *Cycle Trader* before he joined the firm at Evington Valley Mills. A "sport" in the best sense, Trevor has a fund of publicity experiences, and can relate a "Fleet Street story" as entertainingly as anyone I know.

## England's Varied Scene

MY post frequently contains interesting letters from cyclists about touring grounds and the beauties of the English scene. Often, correspondents are good enough to send me details of some inn, some church, some castle ruins they have come across during their riding, and many times I have been able to add useful data to my touring notes. The other week a rider from Shropshire sent me some notes about that wonderful country around Church Stretton and Ludlow, supplementing it with information about the villages which Mary Webb portrayed so bewitchingly in those incomparable novels, "Gone to Earth" and "Precious Bane." I love Shropshire . . . it is a county all too little known by tourists. What good memories I have of quaint Bridgnorth . . . of ancient Shrewsbury . . . of villages like Alveley, between Bridgnorth and Kidderminster. And if one crosses the border into Herefordshire the land is just as lovely and enchanting. To my Shropshire correspondent . . . my thanks!

## Good Value

IN the summer of 1940 I bought a bicycle for the sum of £5 15s. It was a good bicycle and it has served me well. Never a bit of mechanical trouble; still very roadworthy; still fairly bright and shining! And I have ridden it constantly through fair weather and foul . . . over good roads and bad tracks. I have no accurate details of mileage, but it is obvious that I made a wonderful investment when I went into that dealer's shop in pleasant Sutton Coldfield and made my modest purchase. Can we think of any other product which is better value for money than the bike? Think of the happiness, the health, the convenience which it brings . . . and pay a tribute to the makers of the bicycle, who have built on the first sound traditions, improved and consolidated, and to-day give to the world a product which is surely unique for service and value.

## "Mad March"

EVERY month of the year has its own special characteristics, and although it is natural to prefer the smiling sun of July to the mists and fogs of November, I for one find joy in each month as it rolls round: each is good for cycling, each shows us some different facet of the countryside. So . . . March can give us her own particular joys, and show us the way to characteristic treasures. Good, on a blowy March morning, to tramp over the wide heath and feel the tang of the wind on one's face. The bare trees bend and sway in the breeze, and there is freshness in the air which most effectively blows away the cobwebs of the town and city smoke and grime. One may catch a glimpse of the proverbial "March hare," lolloping over the field to his "forme" in the tufted grass. Over the dark ploughland, the rooks forage incessantly. The sky is flecked with patches of bright blue, and already, despite the lack of sun, the coltsfoot is abloom by the wayside. A great month in which to be out and about; a month which can give us surprises . . . for sometimes a March day will be as warm and genial as May; at other times snowflakes will come wisping over the heath, and we shall be glad to see the crackling fire in the bar of the "Dog and Pheasant" at Little Fradley, at the conclusion of our walk. . . .

# Paragrams

(*Continued from page 42*)

## *Invented Tom Thumb Saddle*

MR. FRANCIS MOXON, of 73, Padholme Road, Peterborough, who has died at the age of 74, was the inventor of the "Tom Thumb" bicycle saddle, which has been on the market for the past 40 years. In 1902 he became associated with the Peterborough engineering firm of Messrs. J. and H. Brown, for whom he travelled extensively in the United States, and in 1909, after devising and patenting the "Tom Thumb" saddle, he formed the "Tom Thumb" Patent Saddle Co. to produce and sell the saddle, and was actively interested in the company until his last illness.

## *Link With The Bone-Shakers*

THE death has occurred at the age of 75 of Mr. George L. Julyan, senior partner in the firm of Messrs. G. L. Julyan & Son, cycle agents and repairers, 48, Cowgate, Peterborough. He was one of the earliest members of Peterborough Cycling Club, which was founded in 1875, two years after his birth, and he retained an interest in the sport all his life. On the afternoon before he died he was busy as usual in his workshop repairing a cycle. The old-established business was founded by his father, the late Mr. G. L. Julyan, 70 years or more ago, and he it was who introduced the bone-shaker to Peterborough riders. Mr. George Julyan was 10 when he first learned to ride one of these cumbersome machines and later he distinguished himself in track and road events as a member of the Peterborough Club and won many awards.

## *A Difference?*

HUMPTY-DUMPTY told Alice that he made words mean just what he wanted them to mean, and a 16-year-old cyclist who was charged at Loughborough with riding down a one-way street evidently has the same idea. He admitted to the magistrates that he was on his cycle and going in the wrong direction down the one-way street, but added: "I was not cycling down in the true sense of the word, but merely gliding down at the side of a friend at a walking pace." Fined 10s.!

## *Public Enemy!*

A DEFENDANT who was charged at Spitalgate (Grantham) Police Court with the unusual offence of having placed tintacks on the public highway, was fined a total of £1 10s. and ordered to pay £1 15s. costs. It was alleged that he scattered about 2 ozs. of ordinary tacks on the road and inside the garden gate of a newspaper roundswoman who had to cycle round with her papers. In a statement, defendant said: "I am sorry about it, but I felt I just had to do something." He did not appear in Court.

# My Point of View

By "WAYFARER"

*The Castle Inn, Chiddingstone, Kent. This fine building with many others in this lovely village are now National Trust Properties.*

## *Old-time "Desperadoes"*

THE Wolverhampton Centenary Book, published a few weeks ago, notes that a mayor of the borough in the '70's was "sensible enough" to dismiss a summons against a person for cycling in the street. There were some "desperadoes" about in those days.

## *Quoth Shaw*

FOR G.B.S. the playwright I have the greatest regard. For G.B.S. the cycling expert I have nothing but amused contempt. Mr. Shaw may be one of the oldest cyclists alive; he may "remember" the bone-shaker and the penny farthing. Cycling opinion has advanced considerably since 1908—40 years ago—when Mr. Shaw admits that he relinquished cycling. This is the advice he now gives us: "When a ride of 50 miles and upwards is undertaken, the cyclist must walk all the hills for the first hour, and postpone all heavy eating until the ride is over. A beefsteak is almost disabling. A thin slice of brown bread with currant jam and a cup of tea or a glass of shandygaff is quite enough." The dictum lacks nothing in the way of Shavian dogmatism. Also, it ignores the personal equation. One wonders how many cyclists could manage a 50-mile jaunt (all hills for the first hour having been walked) on a thin slice of bread—pardon, *brown* bread—with currant jam and a cup of tea? And why the emphasis on *currant* jam? To some people a beefsteak consumed during a half-century jaunt may be "almost disabling." I myself would prefer something lighter, but, given a pause for digestion, I would willingly tackle a steak, whilst to many of my friends (speaking of normal times), it is "the only wear." As to the first part of Mr. Shaw's advice, I respectfully offer him this title for his next play: "Walking Out With a Bicycle," by One Who Has Done It.

## *Cycling Does This, Too*

CYCLE tourists who have visited Aberdovey will not be unaware of the existence of what is known as the Outward Bound School, and they may have seen some of the grand lads, scantily clothed, briskly stepping it out in the course of a route march. Always attracted by young people, and especially by those who recognise the tremendous importance of exercise in the open air—and may I say right here that folks who indulge in football, cricket, tennis, hockey, walking, running, golf, rock-climbing, etc., have my constant good-fellowship, though I reserve to myself the right to consider cycling the best of all pastimes—I was interested in a letter from the Outward Bound Trust which appeared in *The Times* a few weeks ago, outlining the purposes of the movement. The paragraph which particularly claimed my attention was this one: "Facilities to enable boys to come into contact—frequently for the first time—with the stresses of wind and weather, and the dangers as well as the glories of Nature, and so providing an antidote to the stultifying effect of permanent town and factory life."

Does that "ring a bell" in the minds of cyclists? In my case, emphatically yes! Every word can be appropriated by the cycling movement, for surely there is no better medium than cycling for coming into contact with what Robert Louis Stevenson so aptly called "the living out-of-doors"—the stresses of wind and weather; the dangers and glories of Nature. We cannot all attend the Outward Bound School (some of us being too old, or of the wrong sex!), but we can all, or nearly all, obtain certain of the benefits offered by that grand movement, thus doing something to neutralise "the stultifying effect of town and factory life."

Writing in the early days of 1949, I suggest this as a matter for serious consideration in the form of a belated New Year resolution. Go all out for cycling, which contains so much for everybody, remembering that the benefit you extract from the game will bear strict relation to what you put into it. The joys of a winter sunset are not, as a rule, to be found in city streets. Unless your home is exceptionally placed, the delights of a long-distance view must be sought along the road. If you would be a spectator of the endless story which runs from seed-time to harvest—if you would have a front seat to watch the procession of the seasons—if you would take your toll of the annual miracle of spring and look upon miles of fruit trees drenched in blossom—if you would do these things and a hundred-and-one others, then I claim that the bicycle is incomparably the best way of achieving your purpose. It may not all be easy—life itself is like that. There is a price to pay. In racing parlance, you may get a "packet"; you may have to "chew acid," a "basinful" may be your portion. You will get wet and be blown about. Now and again you will—most definitely—have to "work your passage." You will see "the dangers as well as the glories of Nature." But the reward of your enterprise is out of all proportion to the price you pay.

## *The Safe Way*

THE young gentleman who recently attended to my hirsute adornments mentioned in the course of the inevitable conversation—I am a good listener—that he had a headache. I was not greatly interested until he added that he fractured his skull a few years ago in the course of what he called a "push-biking" expedition. Then my ears went back and I gleaned that, when riding downhill in the dark, he hit an unlighted road obstruction.

Now, one does not want to be too superior or dogmatic on a matter of this sort, but such an accident should be avoidable. I know, of course, that it is criminal for a local authority to fail in illuminating a road obstruction, but the grand old policy of every traffic-unit lighting its own way and proceeding at such a pace as bears strict relation to its forward visibility—that gospel, I say, endures. Through all the years it has enabled cyclists, with very few exceptions, to avoid riding into trouble. With adequate headlights the pedalling brigade can travel in the dark at speeds equal to those operating in daylight. With inadequate headlights, the pace of the cyclist must inevitably slow down. He must depend on his forward illumination for the location of all those obstructions which cannot readily be supplied with warning lights—pedestrians, straying animals (including the unpredictable dog), fallen trees, etc. I am convinced that this way—*and this way alone*—lies safety, and, as I look back over a cycling career which covers at least half a century, I realise that once, and once only, has what some people might call this "counsel of perfection" failed. I have always been fond of night riding. In my oil-lamp days I rode at oil-lamp speed in the dark. On transferring my affections to gas lamps, up went my night speed, and I often made a point of using different-sized lamps according to the measure of blackness which was to be expected.

Once, as I say, my policy let me down—or rather, flung me down! It was a dreadful evening in October—one of those occasions which tests the character of a cyclist. I was hours behind schedule, and the light from my gas lamp, which had been giving unwonted trouble, was on its last legs. Fortunately, my speed had been reduced to a minimum, and, when I hit a tree which rude Boreas had laid across the road, it did not matter a lot. I was forcibly expelled from the saddle of my bicycle and found a temporary refuge on a moist roadside bank.

There is hardly need to enlarge on the subject. This was one of those rare events classifiable as a pure accident. It could—and would—have been avoided had my lamp been functioning normally.

## *Transports of Delight*

ON a recent Saturday I was wending my way through suburbia by an unusual route (this part of my journey was a ride with an object, because I wanted to locate the exact position of a house called "Hebridean View," or "The Dust Bin," or something), when I encountered a gentleman who was trimming his garden hedge. He greeted me by name and said: "I first met you at Arenig, oh, many years ago now." (By "Arenig" he meant the gorgeous farm, Rhyd-y-fen, in the shadow of that mountain, on the hard road between Bala and Ffestiniog. The kind people who ran the farm in those days, and who were such specialists in the dispensing of food, are no longer there, and I know nothing of the place now.) The little wheels in my head began to go round rapidly, but they told me nothing about the identity of my friend. When, however, he mentioned that he maintained a small hut a few miles away, where the Midland Plain sweeps down towards the valley of the River Avon, my mind filled in the details, and I was able to tell him his name and to recall a chance meeting with him along the road three or four years before.

Our talk about old times at Rhyd-y-fen was interrupted by the discouraging answer I returned to an inquiry as to whether I was fond of gardening. Then, after a while, he asked me to accompany him to his back garden for a moment, and there he handed me a piece of stone, about 12 inches long, with a recess in which reposed an almost circular pebble. "From the top of Arenig," he said—and instantly I was transported across the hundred miles separating us from the point he mentioned. The Berwyns, the Arans, and Arenig passed in procession across the screen of my memory, and I saw myself fighting my way against a relentless wind and over a road of wicked surface through that glorious and ever-rewarding moorland which stretches towards the majesty of Snowdon.

I came back to earth and found that I *was* interested in gardening, after all. My friend and I commenced a tour along the backbone of England, and into Scotland and thence to Switzerland, viewing with curiosity and delight the harvest of rocks and plants he had brought back with him from many holidays awheel.

## *The "Lazy" Cyclist*

IT is curious how some people view indulgence in utilitarian cycling as sheer laziness. More than once, when I have been asked to dash to the shops for something or other, my statement that "I would go on my bike" has brought forth the criticism, "Lazy thing!" But there is nothing whatever lazy in choosing the bicycle in preference to shanks's pony, and there is a great deal to be said for disposing of a purely utilitarian job by the quickest and easiest method available, thus saving up time for more important and more entertaining tasks. And, incidentally, how useful—how very useful—the bicycle can be for mere errand-running!

## *Meanwhile. . . .*

THE new plan for a series of motor roads—some day—has been generally applauded. It is felt that the effect of this plan on accident statistics will be most beneficial. But all that belongs to the future—and judging by our present economic conditions, the rather far-distant future. Meanwhile, it is pertinent to enquire whether the existing state of affairs is to continue. Are any current steps to be taken to reduce the number of fatal and non-fatal accidents on the public highway? Or do we wait? The question demands an answer.



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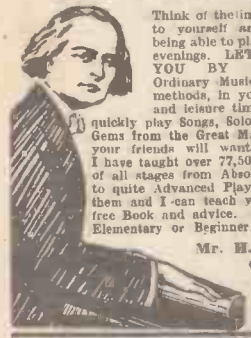

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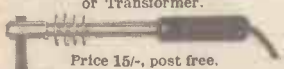

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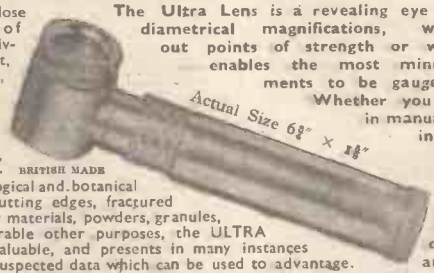


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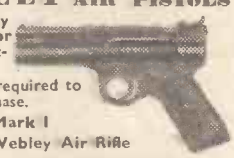

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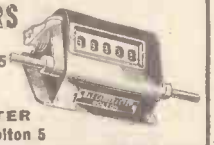

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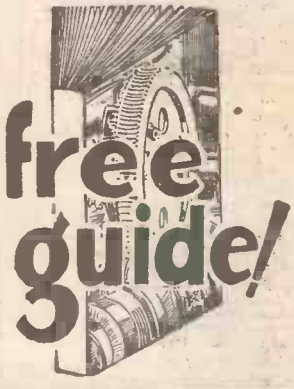


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